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REPLY TO  
ATTENTION OF

SUBJECT: 2008 Army Modernization Strategy

25 July 2008

After more than six years, we continue to fight a war that has involved all Soldiers, across the total Army Force. As current operations have forced the Army to address challenges in our current fight, we have also had to reflect on future needs — what capabilities the Army needs in the future to remain dominant in an era of persistent conflict.

Our goal is to explain what our modernization strategy is, and how it supports the Army's Imperatives designed to bring the Army back into balance by the year 2011. Formerly known as *The Army Modernization Plan*, the year's *Army Modernization Strategy* describes how we are modernizing to meet current and future challenges.

This 2008 document is radically different from previous years. This year we get right to the heart of things with a brief description of our modernization strategy—with the ends, ways, and means of how we intend to use the Army Equipping Enterprise to reach end of state defined as: **Soldiers equipped with the best equipment available, making the Army the most dominant land power in the world, with full spectrum capabilities.**

We are communicating our priorities in a dynamic, uncertain era. While many aspects of our programs will evolve—due to the realities of war and fiscal constraint—this document reflects the materiel and modernization priorities we have established to restore balance across the force.

Details on major Army modernization programs and equipping initiatives, and advancements across DOTMLPF, are provided electronically in the CD enclosed with the document.

America is engaged in an era of persistent conflict that will continue to stress our force. To win this fight, we need an Army that is equipped for the long haul—that has what it needs for Soldiers to accomplish their missions across the full spectrum of conflict. So far, with support of the President, Secretary of Defense, and the Congress, we have been able to provide our Soldiers with the best available equipment and we must continue to provide only the best, today and tomorrow.

A handwritten signature in black ink, appearing to read "S. M. Speakes", is positioned above the typed name.

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# MODERNIZATION STRATEGY

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## 2008 ARMY MODERNIZATION STRATEGY

### Chapter 1 – The Army Modernization Strategy

#### Introduction

The Army's enduring mission is to protect and defend our Nation's vital security interests and to provide support to civil authorities in response to domestic emergencies. This requires an expeditionary, campaign-quality Army capable of dominating across the full spectrum of conflict, at any time, in any environment and against any adversary—for extended periods of time. To do this the Army must continually review its structure and capabilities to ensure it remains adaptive and responsive to the evolving world security environment. While maintaining our mission focus on preparing forces and building readiness for counterinsurgency operations in Iraq and Afghanistan, the Army must remain ready to provide the Combatant Commanders with the forces and capabilities they need for full spectrum operations anywhere in the world—both now and in the future.

The 2008 Army Modernization Strategy provides a summary of the ends, ways and means through which the Army will equip itself and continue to modernize in support of this end. It describes the operational environment—an “era of persistent conflict”—and the Army's newest doctrine for dominating in that environment. It describes the challenges the Army is facing as it executes the current fight while preparing for the future, and the imperatives established by our senior leaders for restoring balance to the force. Finally, it details the four Elements of Modernization—the specific “ways” in which the Army's equipping and modernization efforts support rebalancing the force and integrating capabilities necessary to ensure our success across the range of operations, from peacetime engagement to major combat operations.

#### Strategic Environment—Era of Persistent Conflict

We have entered an era of persistent conflict, which for the foreseeable future will place us in a security environment much more ambiguous and unpredictable than that faced during the Cold War. A key current threat is a radical, ideology-based, long-term terrorist threat bent on using any means available—to include weapons of mass destruction—to achieve its political and ideological ends. And, unlike previous threats manifested in rationally-acting nation states, this one is not easily deterred nor defeated by the traditional elements of national power. We also face new security challenges influenced by the effects of globalization, especially in failing states and in ungoverned areas. Finally, we face a potential return



to traditional security threats posed by emerging near-peers as we compete globally for depleting natural resources and overseas markets. Specific trends of this evolving security environment include:

- An expanding, interconnected global economy supported by advancements in technology will continue to drive prosperity. However, this will also underscore wealth and power disparities between populations while providing the means to export terror and extremism around the world—to include the proliferation of weapons of mass destruction
- Radicalism influenced by extremist ideologies and separatist movements will remain attractive to those who feel threatened and victimized by the cultural and economic impacts of globalization
- Population growth—especially in less-developed countries—will expose a resulting “youth bulge” to anti-government and radical ideologies that potentially threaten government stability
- Resource competition induced by growing populations and expanding economies will consume ever increasing amounts of food, water and energy. States or entities controlling these resources will leverage them as part of their security calculus

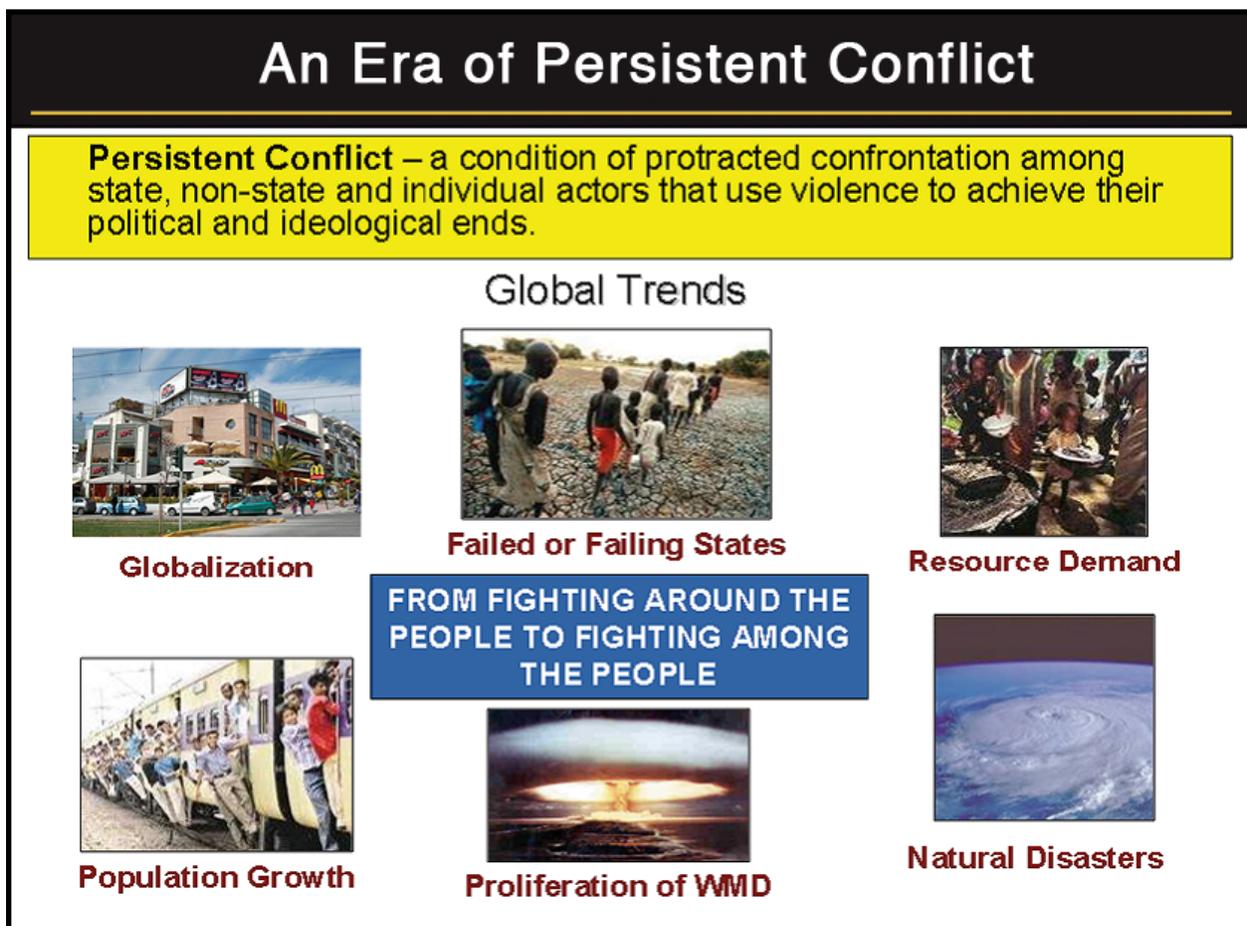


Figure 1– 1, “An era of persistent conflict” - Key trends driving the shape of the strategic environment are globalization, population growth, increasing resource demands, natural disasters, weapons of mass destruction proliferation, failed and failing states.

- Climate change and natural disasters will compound already difficult positions in many developing countries, thereby increasing the potential for humanitarian crises, epidemic disease and regionally destabilizing population migrations
- Proliferation of weapons of mass destruction and effects will create the potential for catastrophic attacks. Attacks of this nature will be destabilizing globally, and will undercut the confidence that spurs economic development
- Safe havens that create opportunities for global and regional groups to organize and export terror will be created by states unable or unwilling to exercise control within their borders. This will also enable these organizations to challenge central government authority and launch broader security threats

Clearly, our most immediate concern is ensuring readiness to succeed in current operations. However, the evolving strategic environment will continue to place steady demands on the Army long after we conclude operations in Afghanistan and Iraq. We can expect future foes to be innovative and adaptive, and fully adept at exploiting a globalized world to their advantage. The implication for the Army is that we must continuously and aggressively modernize our capabilities to ensure we remain a dominant force, capable of operating in complex environments across the full spectrum of conflict.

## Army Out of Balance

The Army is engaged in the third-longest war in our Nation's history and the longest ever with an All-Volunteer Force. Continual deployments in support of the Global War on Terrorism (GWOT) have caused the Army to become out of balance with the demand

for forces exceeding the sustainable supply. The pace of operations coupled with insufficient time between deployments is forcing the Army to focus on counterinsurgency training and equipping to the detriment of preparing for full spectrum operations. In addition, equipment that is being used repeatedly in harsh environments is wearing out more rapidly than programmed and overall readiness is being consumed as fast as it is built. Most importantly, the lack of balance is reducing the Army's strategic depth and degrading our ability to readily respond to other contingencies.

Despite these challenges, the Army is committed to restoring balance in order to preserve the All-Volunteer Force, develop the necessary depth and breadth in Army capabilities and build essential capacity for the future by addressing these imperatives: **Sustain, Prepare, RESET and Transform**. The Army's modernization strategy specifically relates to imperatives Prepare, RESET and Transform.

## Evolving Doctrine—Operations in an Uncertain Future

The full-spectrum capabilities necessary to fight in the 21st Century are heavily influenced by the new ways we are developing to operate and fight in persistent conflict. The Army recently unveiled its newest doctrine, *FM 3-0 Operations*, which provides a blueprint for operating in an uncertain future, and serves as a principal driver for changes in our organizations, training, leader development, personnel policies, facilities and **materiel development**.

FM 3-0 institutionalizes how commanders employ offensive, defensive and stability or civil support operations simultaneously. FM 3-0 acknowledges the fact that 21st Century operations will require Soldiers to engage among populations and diverse cultures instead of avoiding them. Success in these operations

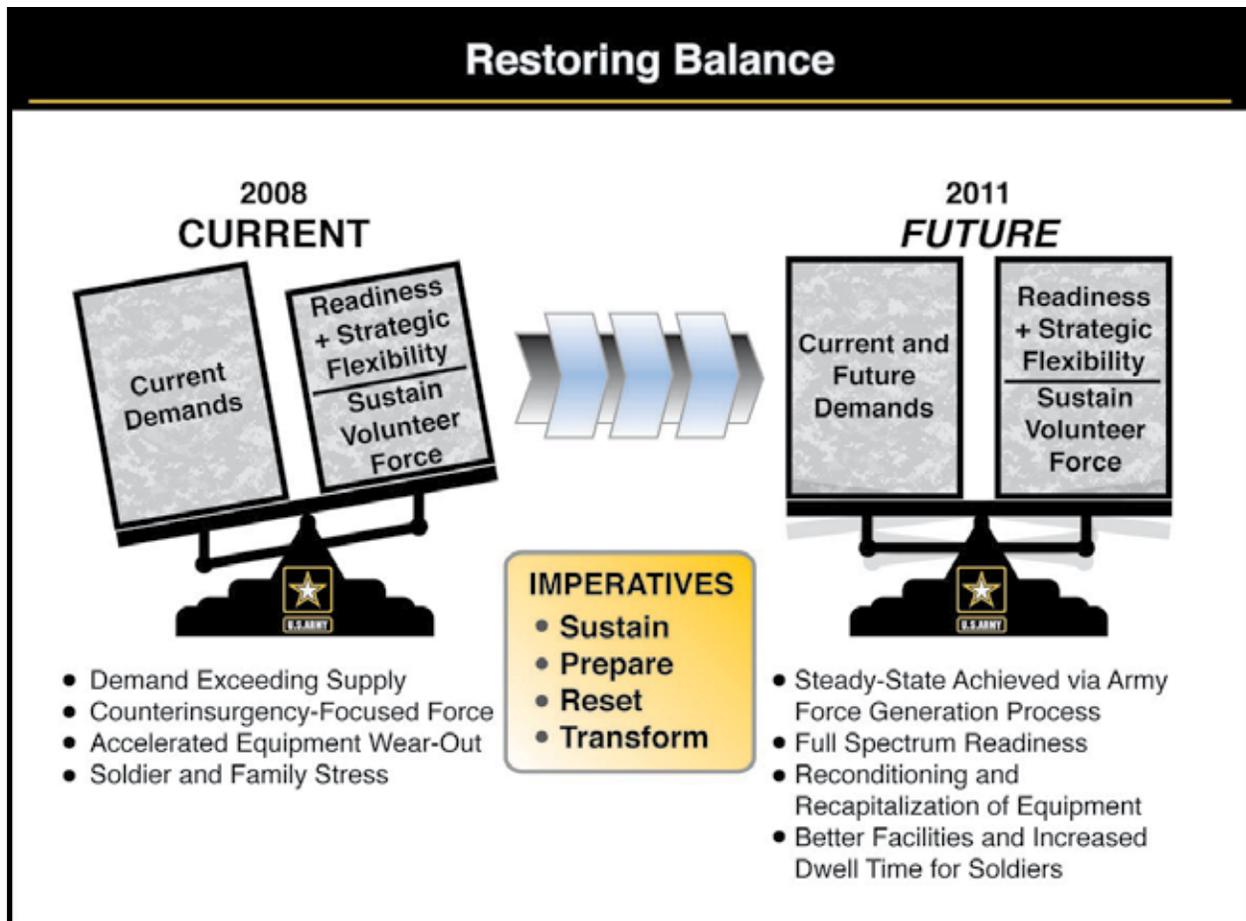


Figure 1–2, “Out of Balance” assessment = stretched and stressed All-Volunteer Force–Demand –exceeds supply –COIN-focused force –Accelerated equipment wear out – Soldier and Family stress

will require the protracted application of all aspects of national power and cause us to place equal emphasis on tactical tasks dealing with the people as with those related to the execution of combat operations. A primary purpose of the modernization strategy is ensuring the Army has a comprehensive balance of integrated capabilities for accomplishing its wide array of missions.

Conflict remains a fundamentally human endeavor. Although the operating concept defined within FM 3-0 provides a major impetus to the development of the strategy, Soldiers as the foundation and centerpiece of the Army remain its focus. Soldiers are the ultimate sensors, analysts, decision makers and shooters and

they remain our most important advantage in an era of persistent conflict. It is imperative that we ensure our materiel solutions provide the capabilities our Soldiers need to guarantee success.



## The Army Modernization Strategy—Ends, Ways and Means

### Ends

The Army is committed to never putting a Soldier in a “fair fight.” Therefore, the Army Modernization Strategy strives to ensure that the Army continues to be equipped with capabilities that guarantee its stature as the preeminent land combat force in the world. To do this the Army must concentrate its equipping and modernization efforts on two mutually supporting ends—**restoring balance** and achieving **full-spectrum dominance**.

The Army Modernization Strategy directly supports restoring balance through the Army Imperatives: Prepare, RESET and Transform. Specifically, to **Prepare** our Soldiers, units and equipment we must maintain a high level of equipment readiness for the current operational environments, especially in Iraq and Afghanistan. To **RESET** our force we must properly posture Soldiers, units and equipment for future deployments and other contingencies. Finally, to **Transform** our force, we must continuously improve our capabilities to meet the needs of the Combatant Commanders in a changing security environment.

Central to the efforts is the need to upgrade and mobilize equipment for our Soldiers in the current fight. This ensures readiness with units equipped to succeed in a variety of contingency scenarios and transformed as a part of Joint, multinational or interagency efforts with modernized equipment.

The Army Imperatives recognize that restoring balance is about more than just addressing capacity shortfalls tied to the current fight. It is also about continuously improving our capabilities to ensure Soldiers and

units remain equally adept at executing all types of operations—often times concurrently—from peace time engagement to major combat operations. This is full-spectrum dominance as executed by an expeditionary, campaign quality Army. Expeditionary capability ensures the Army is ready to deploy promptly, at any time, in any environment and against any adversary. Campaign quality means that once the Army is deployed it can operate for extended periods of time across the entire spectrum of conflict.



### Ways—The Four Elements of Continuous Modernization

An era of persistent conflict demands continuous modernization. In the past the Nation could anticipate a strategic pause at the end of a conflict that afforded an opportunity to rebuild military strength in advance of future conflict. Today’s environment of persistent conflict offers no such luxury. Therefore, today’s Army must build the capabilities it needs in the 21st century. This must be done while restoring the capacity to sustain operations over an extended period.

The figure below depicts the trends fueling persistent conflict and the Capabilities the Army requires in the 21st Century.

# The Four Elements of Army Modernization

**1. Rapidly field the best new equipment to the current force**



## The Army's Centerpiece



**2. Upgrade and modernize existing systems**



**3. Incorporate new technologies from Future Combat Systems**



**4. Field the Future Combat Systems (FCS) Brigade Combat Teams**



The Army's Modernization Strategy methodically delivers needed capabilities through the following ways:

1. Rapidly field the best new equipment to the Current Force
2. Upgrade and modernize existing systems within modular formations to ensure all Soldiers have the equipment they need
3. Incorporate new technologies derived from Future Combat Systems (FCS) research and development (R&D) as they become available

4. Field Future Combat Systems Brigade Combat Teams



# MODERNIZATION STRATEGY



**Rapidly fielding new and better equipment** to the Current Force ensures the Army remains adaptive and responsive to evolving situations by providing the means to provide Soldiers with greater **protection**, and enhanced capabilities. Rapid fielding provides Soldiers and units the equipment they need now. Many of these initiatives mature into formal acquisition programs. Virtually all these initiatives provide the Army with expeditious and informative means that facilitate Future Force development. Details of the Army's rapid equipping efforts are presented in Chapter 2.

**Upgrading and modernizing existing systems** allows us to better leverage the Army's considerable investments in its existing capabilities when it makes sense to do so. More specifically, it allows the Army to extend equipment utility while we work to bridge capacity in new technologies and formations. Modernizing existing capabilities through technology insertions also facilitates Future Force development while we maintain comparative operational capabilities within the Total Force mix.

The Army's primary modernization efforts are described in Chapter 3. Additional details on core modernization programs, by functional area, are provided in Annex A.

**Incorporating FCS-based technologies** into all Army Combat Brigades allows the Army to exploit and leverage FCS capabilities efforts sooner with mutually supporting technology enhancements across the force. This facilitates adding new capabilities quickly by leveraging current platforms that can accept technology insertions, and also serves to facilitate earlier integration across other Doctrine, Organizations, Training, Material, Leadership and Education, Personnel and Facilities (DOTMLPF) dimensions. Details of how the Army is facilitating development of the Future Force through the incorporation of FCS Spin-out technologies into the Current Force are provided in Chapter 4.

**Fielding FCS Brigade Combat Teams** fulfills the Army's vision for the future by integrating full spectrum capabilities in an integrated unit design. FCS is more



than just a new type of Brigade Combat Team. FCS is the Army's modernization program consisting of a family of manned and unmanned systems, connected by a common network that enables the Modular Force, providing our Soldiers and leaders with leading-edge technologies and capabilities allowing them to dominate in complex environments. FCS is the core of the Army's modernization effort and serves as a principal driver behind many of our rapid fielding initiatives, R&D, and modernization programs. FCS is underpinned by a common platform that streamlines logistics and extends an advanced network to the tactical units that engage the enemy. FCS will provide our Soldiers with unparalleled understanding of their operational environment while also dramatically improving their lethality and survivability. The Family of Manned Ground Vehicles (MGV) is uniquely relevant for the today's contemporary operating environment (COE) as well as any future battlefield. The enhanced protection, situational awareness, and networked capabilities will ensure our continued dominance. FCS is focused on delivering the capabilities the Army needs: enhanced **Soldier protection**, modular, scalable, and tailorable, **network** at the lowest level, strategic **force projection**—intra-theater operational maneuver and **sustainment, modular**, tailorable forces—**adaptable** to present and future threats, and lethal and non-lethal **overmatch**. Details of how the Army will field its FCS Brigade Combat Teams are provided in Chapter 5.

## Means

Implementing this strategy requires continuing support from Congress. The Army began the GWOT with a \$56 billion shortfall in its equipment and modernization programs. Although we have received significant funding support through wartime supplementals, most of it has served to sustain the Nation's war effort and has not be used to correct pre-existing deficiencies or support modernization. Full Congressional funding support to the Army's current

and future needs is integral to maintaining readiness and modernizing for success in the 21st Century security environment.

The fiscal year 2008 Army equipping base budget provides \$15.5 billion for rapid fielding of new equipment, \$3.9 billion for upgrading and modernizing existing systems and over \$3.4 billion for FCS research and procurement, including Spin-outs. Of note, FCS represents 28 percent of the Army's fiscal year 2008 overall budget for Research, Development, Test & Evaluation and four percent of the procurement budget. The Army will seek to increase modernization funding in its base budget in POM 10-15 to correct previous funding shortfalls and provide adequate funding support to critical programs.

## A Comprehensive Approach

Sufficient investment in modernization provides an Army that is integral to Joint, interagency and multinational success, across the full-spectrum of conflict. Today's Army is moving rapidly in that direction. The 2008 Army Modernization Strategy features the Army's efforts to develop and field improved operational capabilities in order to restore balance and ensure full-spectrum



# MODERNIZATION STRATEGY

dominance. Accompanying advancements in DOTMLPF supporting this strategy and providing integrated solutions which improve how the Army is organized, trained, and equipped are fully examined in Annex B.

Given the challenges we face today, and are likely to face tomorrow, the Army cannot risk delaying execution of our modernization

strategy over multiple decades, stretching out significant increments of modernization such that they may be obsolete as we field them. We must aggressively pursue efforts now to restore balance and achieve full spectrum dominance, in order to guarantee our success in an era of persistent conflict.

## Chapter 2—Rapidly Field the Best Available Equipment to the Current Force

### Introduction

Significant equipping challenges remain for the Army for the foreseeable future as it simultaneously supports current operations, consistently improves the readiness of non-deployed units and transforms to the Future Force. In an era of persistent conflict the Army must be a relentlessly adaptive force. Our Soldiers and leaders have excelled in adapting to the enemy from the early days of operations in Afghanistan to the combat of today. The Army must ensure that the system that equips these brave Americans is equally agile and just as relentless in providing the best available equipment to ensure readiness. Rapidly fielding new and better equipment to the Current Force ensures the Army remains adaptive and responsive to evolving situations by providing the means which allow us to consider what may have not been previously considered or anticipated, thus providing Soldiers and units the equipment they need now.

### Drivers

The Army's equipping demands are influenced by a variety of factors. For more than three decades prior to the GWOT, the Nation and our Army accepted operational risk with a tiered readiness system that allowed certain follow-on, or late deploying units to be equipped to a lesser level, believing there would be sufficient time and resources to get them up to speed before they deployed. Personnel and equipment demands of GWOT have made this way of doing business obsolete. Today's combined

equipment demands of converting to a Modular Force, resourcing Military Transition Teams, supporting pre and post deployment training, increasing operational requirements, replacing Army Pre-Positioned Stocks and generating Theater Provided Equipment are all magnified by existing unit equipment shortages.

Operations in Iraq and Afghanistan also exposed Army capability gaps that resulted from years of constrained resources. The Army has not yet recovered from equipment shortfalls that existed at the start of the war, and in 2013 faces residual unfunded equipment requirements of \$17.4 billion.

Wear and tear on equipment has also been accelerated due to increased OPTEMPO. In the current theater, increased usage and added weight from extra armor are wearing out equipment at up to six times the established peacetime usage rates.

In addition, the non-deployed force lacks the necessary equipment to meet unexpected National requirements. Army National Guard on-hand equipment, identified as critical dual-use equipment, necessary for both deployments and emergency/disaster response, is critically short in some states. These critical shortages limit training, especially pre/post mobilization training and unit abilities to support their respective governors and provide support to other states and Federal agencies. Finally, the need to modernize will never end. While the current operations in Iraq and Afghanistan have forced the Army to address challenges with



its operational capacities and sufficiency's, we have also had to reflect deeper on what the Army will require in the future to remain a preeminent force in this era of persistent conflict.

Collectively, these challenges limit our current ability to fully equip the Army and increase the Nation's strategic flexibility. A modernized Army will require a significant investment in resources over time in support of both current and future modernization to provide a more agile responsive force.

The Army remains committed to aggressively maintaining the best trained, best equipped, most fully manned and best led ground force in the world. To do this though, the Army needs predictable, sufficient and stable funding.

The Army's Modernization Strategy, supported by significant investment, will provide the Nation with a balanced, modernized Army, engaged in persistent conflict that meets all of today's operational needs while building the Army needed in the 21st Century.

## Expediting Capabilities to the Warfighter

The Army, as we entered this war, recognized our processes were too slow, requiring as much as 18 to 24 months to get some of our major systems into the hands of Soldiers. We had to respond and adapt to changing situations, consider what had not been previously considered, and above all, ensure that the Current Force had useable equipment in all new operational environments. We have undertaken numerous initiatives to accelerate acquisition and equipment fielding—expediting capabilities to the warfighter.

## Army Force Generation (ARFORGEN)

ARFORGEN manages the Army's limited resources more effectively and rids the Army of have and have not units. Under ARFORGEN, units progressively increase in readiness as they progress through three readiness pools:

- An initial RESET/Train pool for units either redeploying from long operations or who spent their available time in the Available Pool and did not deploy but were prepared to do so if directed
- A Ready pool that includes modular units assessed as "ready" to conduct mission preparation and training
- An Available pool that includes modular units assessed as "available" to conduct missions in support of any Regional Combat Commander or serve as rapidly deployable contingency forces

When a unit deploys, it is the best trained, and equipped unit capable of meeting the regional Combatant Commander mission requirements. However, the Army must also continue to invest

in capability by supporting upgrades to current modular formations and by introducing emerging technologies to the force.

## Capabilities Development for Rapid Transition

Capabilities Development for Rapid Transition is a process that identifies non-program of record, non-standard systems or pieces of equipment to be rapidly transitioned into an acquisition program. It also identifies other non-equipment capabilities that merit consideration as potential enduring Army capabilities. In partnership with the Army Deputy Chief of Staff for Operations, TRADOC manages this process to assess systems in operational settings to determine whether or not they should become systems of record and be fielded to the entire Army.

The intent of the process is to enter the formal developments process at a later stage reducing time from the development cycle. An iteration of CDRT lasts six months. It primarily considers material capabilities and these issues are worked in close coordination with a variety of Army agencies, to include:

- TRADOC
- Army Deputy Chiefs of Staff for Intelligence, Operations, Logistics, Communications and Programs
- Office of the Surgeon General
- Army Test and Evaluation Command
- Army Materiel Command
- Assistant Secretary of the Army for Acquisitions, Logistics, and Technology

Lists of equipment candidate systems are streamlined for warfighter assessments. CDRT primarily considers material capabilities and is worked in

close collaboration with HQ TRADOC, ARCIC FWD, HQDA G2, G3/5/7, G4, G6, G8, OTSG, ATEC, ASA (ALT), ATEC, AMC, all COIs and the Operating Force. Iterative lists of equipment candidate systems are streamlined for reasonable warfighter assessments. Its recommendations are ultimately briefed to the Army Vice Chief of Staff.

CDRT's force protection candidates that have become proven winners for our Soldiers are Interceptor Body Armor, IED Route Clearance Package, Armored Security Vehicle and the Common Remote Operated Weapons System. CDRT's most recent candidates include, One System Remote Video Terminal, Green Laser—Z-Bolt, Specialized Search Dogs, Line of Communication Bridging and the Joint Automated Deep Operations Coordination System. CDRT is a relatively new and evolving process that will continue to mature as its utility to the Army grows.



## Rapid Equipping Force

The Rapid Equipping Force mission is to quickly assess what the Army needs and fill those needs by providing commanders with off-the-shelf items, both government and commercial, that reduce risks to Soldiers and help increase their effectiveness. The

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REF works one-on-one with units, either in combat or preparing for it, to find innovative solutions for their immediate equipping needs. They accomplish this by partnering with industry and academia, and with senior leaders and Army organizations such as Army Materiel Command, TRADOC, the acquisition community and the Army Test and Evaluation Command. One main focus is on defeating Improvised Explosive Devices and providing direct support to the Joint IED Defeat Organization and the Asymmetric Warfare Group. The Rapid Equipping Force also deploys teams forward to evaluate deployed force needs and capabilities. To date they have introduced more than 200 different types of equipment and have provided more than 47,000 items to units in Iraq and Afghanistan as well as other parts of the world.

## Rapid Fielding Initiative

In keeping with the “Soldier as a System” philosophy, the Rapid Fielding Initiative provides off-the-shelf technology and items of equipment to Soldiers to enhance their survivability, lethality and mobility. The Rapid Fielding Initiative list is composed of individual equipment that every Soldier receives and additional unit equipment that we field to Brigade Combat Teams. TRADOC updates the RFI list to keep it relevant to lessons learned from the war. The Rapid Fielding Initiative helps save Soldiers’ lives by fielding items such as the Improved First Aid Kit, fielded to every Soldier in theater. We have issued more than a million sets of equipment to Soldiers.

## Reset

The requirement to Reset equipment and return all Army units to full readiness when they return from deployment ensures Army ability to execute follow-on operations. Reset restores equipment and personnel to a desired level of combat capability commensurate with a unit’s future mission. It restores readiness of equipment that has been

damaged, or worn out and replaces equipment that was destroyed. Reset does not fix Army equipment shortfalls, but restores serviceability and capability of equipment on hand, and replaces battle losses with new equipment. Reset planning is synchronized with unit training and deployment schedules.



A fully funded Army Reset program ensures equipment is operationally ready for use by combat forces in Iraq and Afghanistan as well as other missions the Army is asked to perform for the Nation, and by forces that are training prior to deployment. Reset funding should match requirements and be provided in a timely manner to promote cost efficiencies while ensuring Soldiers have the proper equipment first in training, then while deployed conducting operations.

## How the Army is Managing Immediate Equipping Needs

### Life Cycle Management Commands

Established in 2004 by agreement between ASA (ALT) and the Army Materiel Command, Life Cycle Management Commands have enhanced support of Army equipment through improved collaboration

between the acquisition, logistics and technology communities. They bring together acquisition, logistics and technology under integrated leadership to focus all efforts toward supporting the Soldier through the Army Sustainment Command as the single interface point. This construct not only assists the warfighter through improved responsiveness, but also ensures that solutions provided by the materiel community provide the best balance between enhanced capability, speed of acquisition and long-term sustainment costs.

## Army Sustainment Command

The Army Sustainment Command provides field units a direct link for integrating logistics with Joint and strategic partners in the National sustainment base. In conjunction with the Army's Life Cycle Management Commands, the ASC coordinates and establishes an end-to-end distribution pipeline to the deployed warfighter and assists the U.S. Forces Command and Joint Forces Command in the rapid projection of forces to the Regional Commander and return. Through the global presence of AMC's Army Field Support Brigades, the ASC provides a single command structure that coordinates acquisition, logistics readiness and technology integration efforts in the field.

## Theater Provided Equipment

At the end of the Cold War, the "Peace Dividend" resulted in investment accounts being under-funded by \$100 billion resulting in a \$56 billion shortfall for all Army equipment shortages, modernization and operational needs at the start of GWOT. To help overcome these equipment shortfalls a strategy was developed to maintain select equipment in theater for use by rotational forces. This strategy saves time and money by not shipping similar equipment to and

from theater. This is the Army's Theater Provided Equipment pool, providing theater commanders with flexible response options and additional on-hand resources in theater. TPE also decreases direct and indirect costs for repeat transportation of rotational force equipment, reduces convoy exposure time to move equipment into and out of areas of operations, and increases equipment longevity at home by decreasing downtime associated with transporting and resetting equipment.



Theater Provided Equipment consists of items that have been deployed to and left behind in theater to support ongoing operations. As units finish their deployment, TPE is placed in a centrally managed equipment pool, repaired and reissued to units upon their arrival in the area of operations. There are more than 2,000 types of equipment in TPE, including 1.8 million individual items left in theater by all Active, Guard and Reserve units. Much of this equipment consists of items such as anti-IED equipment and up-armored vehicles that are critical for the protection of Soldiers. Equipment left in theater is planned for Reset and for continued use.

## Left Behind Equipment

Left Behind Equipment processes ensure that equipment is maintained and accounted for to support ARFORGEN. When units redeploy from theater, a large amount of their equipment needs to be repaired and Reset, and their inventory is temporarily depleted. LBE is also equipment that is left at home station after a unit deploys. Other units deploying to theater leave some equipment at home, such as un-armored trucks. The intent of this program is to release AC units from responsibility for equipment they will not use in the conduct of their wartime mission. LBE is often used to help equip other units that are training and preparing to re-deploy. HQDA G-8 manages the re-equipping of units and management of G-8 items in accordance with HQDA G-3 priorities. This insures redeploying units are fully equipped.

## Army Pre-positioned Stocks

Army Pre-positioned Stocks have provided Combatant Commanders with a modern fleet of equipment to directly support contingency operations throughout the world. APS consists of pre-positioned unit sets, operational stocks, sustainment stocks and War Reserve Stocks. These are critical warfighting stocks, located in strategic land and ship-based locations, thus reducing deployment response times for Army forces during contingencies. Pre-positioned stocks are important in reducing strategic lift requirements and improving force closure times.

Whether on specially-designed ships, or stored in various strategic locations, APS provides a flexible, sustainable and strategically responsive force that can rapidly engage in Army and Joint operations.

The Army has used equipment from all five of our pre-positioned sets to support OIF/OEF. Since 2003, the Army has been resetting and reconfiguring pre-positioned stocks to match Army Modular Force designs. This includes heavy equipment such as Abrams tanks, as well as repair parts and other assets assigned to APS.



As a part of Reset, items drawn from APS stocks will not only be replenished to pre-war levels, but also modernized to a more current configuration that allows Soldiers to quickly operate this equipment in support of short notice, full spectrum military operations.

## ReUse

ReUse is the process the Army uses to ensure all available equipment, whether new or used, is redistributed to fill requirements for the Total Force. Driven by operational requirements, Army equippers use ARFORGEN, TPE and LBE programs to ensure allocation of the right mix of equipment to

provide to operationally ready units. This includes equipment needed by National Guard units to perform Homeland Security and Homeland Defense missions, and equipment required for the Army's training base. Currently the Army is managing more than 96,000 pieces of equipment through ReUse.

## Army Enterprise Equipping and ReUse Conference

The Army uses twice-yearly Army Enterprise Equipping and ReUse Conferences to synchronize Army Equipping Enterprise Architectures with equipment requirements, modernization plans and delivery of equipment. Army equippers, planners and force developers from all Army Commands, Army Service Component Commands and Direct Reporting Units use AEERCs to schedule deliveries of equipment from production, RESET, TPE and ReUse.

As a result of the latest AEERC conducted in January 2008, the Army was able to schedule over \$56 billion of equipment distributions to Active and Reserve formations from January 2008 to 31 December 2009. This includes \$34.6 billion to the Active Component, about \$17.5 billion of equipment for the ARNG and over \$4 billion of equipment for the USAR.

## Army Equipping Enterprise System (AE2S)

The Army Equipping Enterprise System (AE2S) provides Force Development, Army G-8 and HQDA Staff with an authoritative, analytical and collaborative set of tools. AE2S will seamlessly support the Equipping Process from requirements determination, resourcing and programming to delivery of capabilities to the Army. This initiative began in 2007 and in March 2008 the AE2S support contract was awarded that began the first phase of a multi-year effort to integrate the Army G-8 equipping

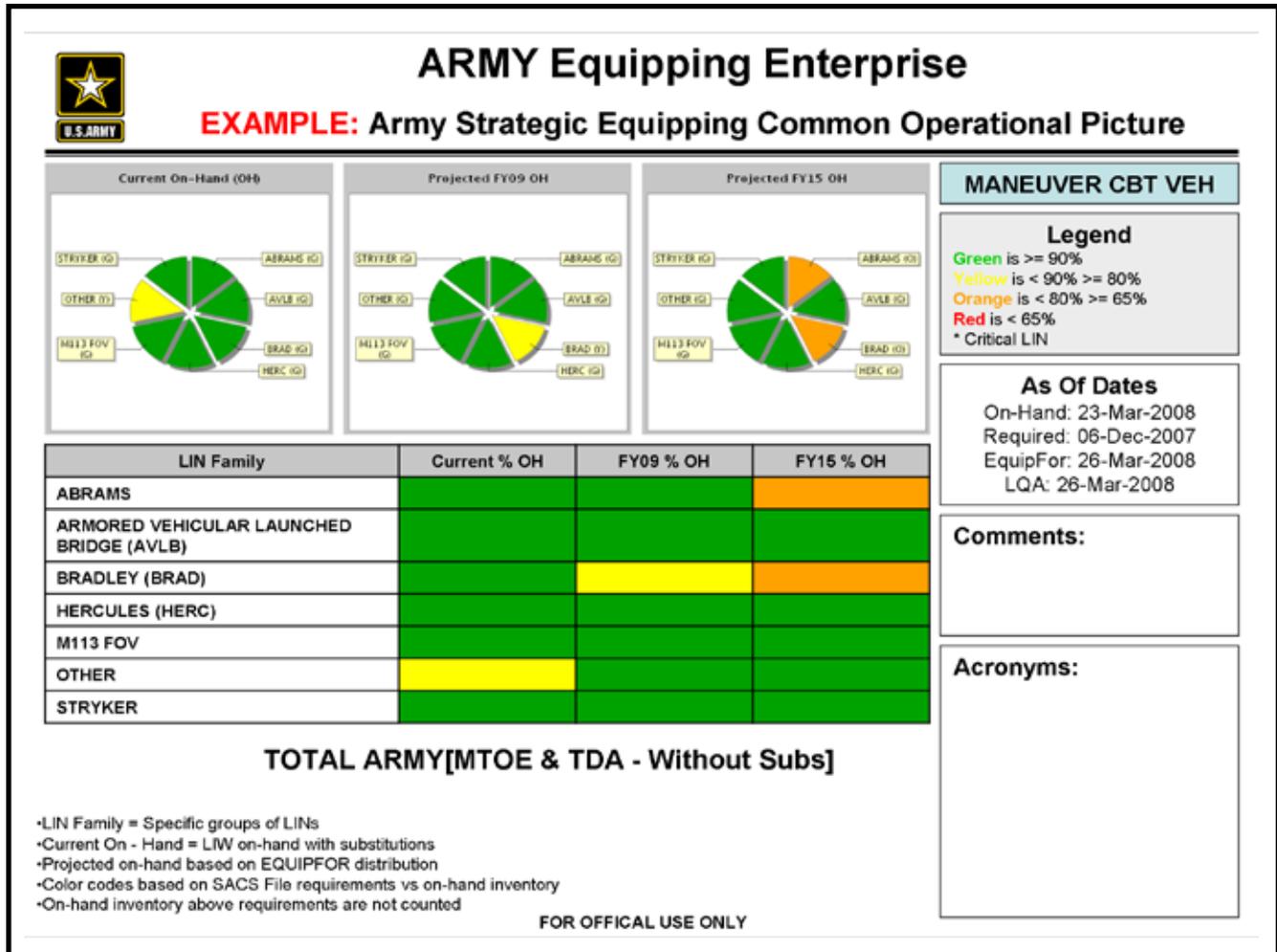
systems into one collaborative equipping process application. The three major applications within AE2S are the Army Flow Model, Force Development Investment Information System and EQUIPFOR. One of the new tools to provide our staff and leaders with a comprehensive view of our equipping efforts resides in AE2S. The Strategic Common Operation Picture (shown in the chart on the following page) combines authoritative information concerning requirements, inventory, distribution and Future Years Defense Planning equipment procurements to project equipping postures for individual items and groups of items making up major capabilities. This tool is expected to serve as one of the major projection tools for the Army G-8's AEERC.

The AE2S also contains EQUIPFOR which is the Army G-8 distribution system that serves as the primary planning tool for the staff to distribute newly produced equipment or equipment modified and ready for distribution. Current initiatives to update and expand the use of EQUIPFOR include extending its use to the Army Materiel Command for critical AMC managed procurements.

## Reserve Component Equipping

Reserve Components are also part of the Army Equipping Enterprise. These units provide essential combat and support capabilities and comprise 55 percent of the Army's structure. Pre-war ARNG equipment levels were at 70 percent of "Army of Excellence" unit designs, most of which was old, obsolete and worn equipment. The current shift from strategic reserve to an operational reserve force requires the assurance that RC units are equipped, trained, manned and structured like the AC to provide the required land forces to support the Nation's defense strategy and provide support to Civil Authorities. To accomplish this, the Army National Guard is being resourced \$49.1 billion from

# MODERNIZATION STRATEGY



The linkage between the Army G-3 Force Management Structure and Composition System for requirements, the Army G-4 Property Book Unit Supply -Enhanced (PBUSE) for inventory, EQUIPFOR for distributions and Force Development's Force Development Investment Information System (FDIIS) for procurement quantities allows the Army G-8 to synchronize information to support the equipping process.

2001 through 2013, while the Reserve is being resourced \$15.7 billion for the same time period. From January 2008 to December 2009, the Army plans to deliver over 400,000 pieces of equipment worth about \$17.5 billion to the ARNG and over 118,000 pieces of equipment worth \$5 billion to USAR. The ARNG will reach 77% equipment on hand (EOH) by the end of fiscal year 2008; and 74% EOH by the end of fiscal year 2009 based on fiscal year 2013 MTOEs.

## DoDD 1225.6 Paybacks

The Secretary of Defense provided specific guidance in DoD Directive 1225.6 that requires the Army to replace equipment transferred from one component to another on a one-for-one basis. The National Defense Authorization Act of 2007 reinforced this directive making it law. Per this guidance, the Army documents equipment transfers and develops payback plans coordinated between Department of the Army, the Army National Guard and Reserves and approved at Defense Department level.

The Army is validating payback actions for equipment that was transferred out of RC to other units. To date, the Army has validated the transfer of more than 54,000 items of equipment from the ARNG and USAR to the AC to support deployed forces and Soldiers in training. Currently, \$2.5 billion worth of equipment has been validated for repayment and plans have been established that will distribute more than \$2.3 billion in equipment to the RC by the end of fiscal year 2009. The Army is also reducing the amount of RC equipment being transferred, and is continuing to monitor and improve the process.

## Homeland Defense

The Army has a long tradition of support to Civil Authorities, while maintaining its primary mission of fighting and winning the Nation's wars. While the Army does not typically resource equipment specifically for Homeland Defense and support to Civil Authorities missions, it does recognize priority Army National Guard equipment as critical dual-use equipment which is used to support both combat and Civil Authorities support missions. We make an effort to field this equipment first.

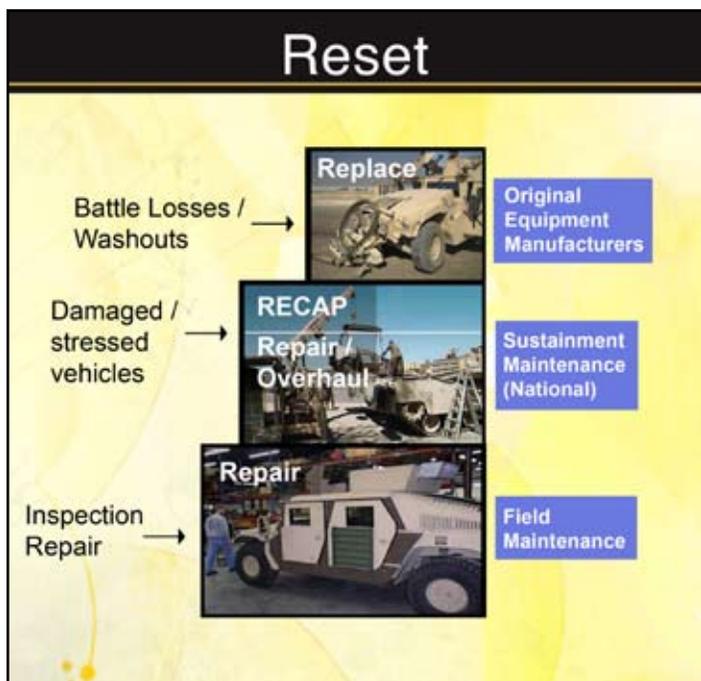
The Army Staff, ARNG and the Army Reserve worked collaboratively to identify and prioritize the Baseline

Equipment Set for Homeland Defense and Support to Civil Authorities. This Baseline Equipment Set currently consists of approximately 342 equipment types identified as dual-use items that are managed in 10 essential capabilities: Aviation, Engineering, Civil Support Teams, Security, Medical, Transportation, Maintenance, Logistics, Joint Force Headquarters and Communications.

## Response to Natural Disaster

The equipping levels for dual use equipment in the non-deployed ARNG units in some states could impact on the state's ability to respond to state emergencies. In those cases, neighboring states provide equipment and unit support through the Emergency Management Assistance Compact. Response to natural disasters is not just an Army Guard mission but a Total Force mission. When a natural disaster hits a state where the ARNG does not have all of its required resources, Active Component and Army Reserve units provide needed personnel and equipment as requested by the state. To mitigate state requested dual use equipment shortages during the 2006 and 2007 hurricane seasons, the Army provided all equipment identified by the ARNG to support hurricane preparedness.

## Sustaining the Army's Equipping Needs



### Reset: What the Army is Doing to Sustain Equipment on Hand

In fiscal year 2007, Congress provided the Army with \$17.1 billion in supplemental funding for Reset, and is aggressively executing funding to provide equipment for deploying units. The majority of the procurement funding was obligated within 90 days of receipt, while OMA obligations occurred throughout the fiscal year as equipment was returned and repaired. Even when fully funded, Reset merely holds the line on equipment readiness so that it does not degrade further. It is not the final answer for improving overall Army readiness, but does effectively support the rapid return of equipment to a ready state for deploying units. In certain instances, Reset provides improved capabilities through equipment recapitalization.

The Army must continue to Reset equipment to rebuild readiness consumed in current operations,

and prepare for future deployments. We must partner with our industrial base to repair, replace and recapitalize equipment lost or damaged in current operations, while upgrading both capacity and capabilities through our modernization efforts. The Army will have to repair, replace and recapitalize equipment for a minimum of at least three years after the end of the current conflict. OIF/OEF has forced the Army to adapt to a more formal integration of Reset processes, namely: Repair, Replace and Recapitalize.

### Replacement

Replacement is the procurement of new equipment to replace battle losses or equipment deemed too expensive to repair. Equipment lost due to combat action or that is not economically repairable is replaced from the industrial base. The Army procures the newest versions of equipment it can to replace battle losses, ensuring the longest possible shelf life within the Army Modular Force.



In addition to the replacement of end items, replacement also includes the purchase and installation of supply parts and assemblies installed into pre-existing Army equipment. Done primarily when a system undergoes maintenance and repair, the incremental installation of improved

parts provides significant improvements to Army equipment without having to remove the item from the unit's inventory.

As part of this effort, in 2007 the Army procured or replaced over 50,000 pieces of equipment, to include 55 helicopters, 462 Abrams Tanks, 441 Bradleys, and more than 19,500 wheeled vehicles. Also, in 2007, \$2.5 billion of \$17.1 billion was used for Reserve Component equipment replacement per DoD Directive 1225.6.

## Recapitalization

Recapitalization is depot-level maintenance activity that extends the useful life of systems by completely rebuilding and introducing selected upgrades to the fleet. It is the Army's long-term investment strategy to sustain equipment readiness. RECAP is accomplished by rebuilding old, worn-out, or combat-damaged equipment to a "zero mile/zero hour" level with original performance specifications. This is done by using Research, Development, Test and Evaluation, procurement, or operation and maintenance funds. RECAP objectives include: (1) extend service life; (2) reduce operating and support costs; (3) improve reliability, maintainability, safety and efficiency and (4) enhance capability.

RECAP is an effort usually conducted at either a depot, contractor facility or a combination of the two. Items placed in RECAP are completely disassembled, have all outdated and worn parts stripped and are rebuilt from the frame up, using the latest parts and manufacturing processes.

The end state of RECAP is a fully refurbished and modernized piece of equipment that has been restored to its original condition and has new capabilities. On the average, items placed through RECAP not only represent the most modern configuration, but are

far more reliable and have their useful service life dramatically extended, reducing the burden on the acquisition community.

The Army's plan to recapitalize major combat systems ensures required capabilities are available for the next fight. Major systems being recapitalized include the Abrams Tank, Bradley Fighting Vehicle, 105-millimeter Light Howitzer, HMMWV and Apache Attack Helicopter. Recapitalization may include pre-planned product improvements, extended service programs and major modifications, but these programs alone are not recapitalization unless the system is restored to zero time/zero mile condition.



## Repair

Repair of Army equipment involves inspection followed by repair and rebuild of equipment to meet Army maintenance standards. Repair is essential to maintaining not only readiness, but is also a primary means of providing incremental modernization. This occurs by installing better parts and using more efficient maintenance procedures.

Repair restores equipment to meet the Army operator's fully operational maintenance standards,

and other unique requirements. As equipment is broken, worn out or damaged, the Army repairs it to prescribed standards to provide fully mission capable equipment. In fiscal year 2007, the Army repaired 57 crash-damaged helicopters, 190 Abrams, 364 Bradleys, 1,600 wheeled vehicles and more than 35,000 small arms in depots. At field level, the Army repaired 563 aircraft and Reset 27 Brigades: 20 brigade combat teams, four aviation brigades, two support brigades and one fires brigade. When possible, repairs are performed directly on each system. For Reserve Component units, the Army has further streamlined this process by performing repairs at National Guard facilities. This allows the ARNG to prioritize requirements and return equipment to units under the control of state authorities sooner, increasing their capability to respond to domestic missions.

## Sustainment

For all Army Components, repairs that exceed field level capability are performed at depots by organic depot and material maintenance contractors. These depots ensure broken or damaged equipment is repaired to fully operational standard as a part of equipment Reset. The majority of these repairs are executed at Anniston, Corpus Christi, Letterkenny, Red River and Tobyhanna Army Depots.

A key part of Reset at the Sustainment level is the Automatic Reset Induction (ARI) program. ARI is based on lessons learned from Army Materiel Command that identified a list of equipment that after use in combat is automatically returned for sustainment level Reset maintenance. This program speeds the planning and programming of depot level equipment Reset operations and helps speed the equipment flow through the depot system.

## Depot Production & Capacity

Depots are resetting equipment and recapitalizing battle-damaged vehicles and equipment at historically high levels. From the beginning of combat operations through fiscal year 2006, more than 200,000 pieces of equipment have been Reset, including 1,798 aircraft, 2,263 tracked vehicles, 11,312 HMMWVs, 3,899 trucks, 2,193 trailers, 128,531 small arms and 8,284 generators. These figures are only a snapshot of this enormous effort. In fiscal year 2007, the Army Reset approximately 133,000 major items of equipment and hundreds of thousands more pieces of equipment. Currently, the capacities and capabilities of the Army's Industrial Base provides the Army not only with significant Reset and RECAP services, but also Battle Damage and Repair facilities that exceed both field and garrison-level operations.

The overall capacity of our depots has increased to its highest levels since the Viet Nam War. Direct labor hours at the depots have increased as well, from 16.3 million in fiscal year 2004, to 24.2 million hours in fiscal year 2007. The Army's organic depots have steadily increased their capability while simultaneously increasing efficiencies. Examples include:

- The work at Red River Army Depot increased from 400 items per month in October 2006 to 700 per month in September 2007
- Anniston Army Depot increased its effort from 1,500 to 7,000 items per month by the end of fiscal year 2007

Timely receipt of the fiscal year 2007 \$17.1 billion Reset Supplemental enabled the Army to manage Reset more efficiently and effectively, allowing depot growth to help eliminate carryover depot

backlog requirements. This allowed for the Reset of 27 BCTs within fiscal year 2007 and projecting an elimination of the current HMMWV backlog by March 2008.

## Reset Pilot

The purpose of the Reset Pilot test program is to establish a balanced process following an extended deployment that systematically restores deployed units to a level of personnel and equipment readiness that permits the resumption of training for future missions. The Reset Pilot will act as a forcing function to force institutional change required to implement Reset. The focus of the Reset Pilot is unit, not individual, reconstitution. The Reset model, when fully implemented, will accelerate reconstitution of the force, increase unit readiness, and improve preparation for deployment for next-to-deploy units.

The Army is conducting a Reset Pilot test of eight AC and five RC redeploying units in order to determine institutional adjustments required to support implementation of ARFORGEN. The 4/25 Airborne Infantry BCT was the first unit to enter the pilot test on 12 December 2007 is proceeding on schedule. Reset Pilot will test the following units:

- 864 EN HVY BN
- 116 IBCT (ARNG)
- 3 ASG
- 111 EN BDE (ARNG)
- 478 EN BN (USAR)
- 325 MD (CSH) (USAR)
- 396 EN CO (USAR)
- 82 DIV HQ

- 1/3 ID
- 4/25IBCT (Abn)
- 2/82 IBCT (Abn)
- 173 IBCT (Abn)
- 82 CAB

This will be a three phase operation:

**Phase 1:** Return minus 180 days (AC/RC)

**Phase 2:** Return to Return plus 180 days (AC)/  
Return to Return plus 12 months (RC)

**Phase 3:** Return plus 180 days to LAD (AC)/  
Return plus 12 months to Return plus 24 months (RC) where "Return" is defined as 51% of personnel returned to home station.

Chief of Staff of the Army (CSA) has directed that we reequip 8 A/C and 5 R/C units to S-2 in 180 days after return for Active and 360 days up on returning for Reserve. This is part of the CSA goal to rebalance the Army with a focus on readiness across the force and build combat power regardless of LAD. In real terms we assess the ability to execute Reset pilot equipping requirements in fiscal year 2008 and to implement this in broader terms in fiscal year 2009. Our old equipping strategy focused on equipping deliveries driven by LAD and MRE training, our Pilot strategy stresses equipping units upon return, not LADs.

## Reset Accountability

Reset is a strategic pillar of our modernization strategy—it restores readiness, rebuilds unit readiness and cohesion and builds on the experience



of combat operations to build strategic depth for future challenges. Resetting our forces rebuilds and restores strategic depth consumed in six years of combat operations. The Army will fix, replace and upgrade our equipment and prepare all for future deployments and future contingencies. We must Reset to reverse the cumulative effects of sustained high operational tempo.

## Reset Task Force

To manage Reset the Army has established a Reset Task Force composed of elements throughout the Army Staff, Army Materiel Command, Forces Command, U.S. Army Europe, U.S. Army Pacific, U.S. Army Special Operations Command, the Army Reserve, the Army National Guard and other Army elements as required. The RTF tracks and coordinates Reset at Department of the Army level.

For the past several years the Army has estimated Reset requirements to be around \$13 billion annually. Because of the increase in forces and the extension of tours of duty needed to meet operational requirements, the Army expects this to potentially increase by \$2.5-3.5 billion. Also, the Army recently downloaded two pre-positioned stocks sets of \$2.2 billion worth of equipment to fill force requirements that have now been requested for replacement equipment. This

level of Reset funding is a spike that reflected the surge of forces in theater. Reset funding is closely related to the size and intensity of operations that is expected to continue until at least two to three years after the conclusion of combat operations. The Army must continue to be resourced at these levels to maintain our equipment readiness.

The receipt of Reset funding early in the fiscal year is essential to keeping the program on track and preparing next deploying units for their missions.

A majority of Reset are equipment costs resulting from wartime operations. Those costs are reflected in requests for supplemental appropriations, not in the President's Annual Budget Request. A small portion of Reset costs are unrelated to wartime operations and funded through the base budget. Section 1008 of the fiscal year 2007 NDAA requires the President submit as part of his annual request for funds, for each fiscal year after 2007, a request for funds for ongoing military operations. That section requires Reset be part of base budget requests. Any initiative to move Reset funding into the base budget versus supplemental funding, as long as the Army's top line is appropriately adjusted upward, would ensure long-term success for many Army programs.

## Chapter 3—Upgrade and Modernize Existing Modular Formations to Ensure All Soldiers Have the Equipment They Need



### Introduction

Army modernization employs the materiel solutions necessary to develop a networked, Modular Force that is agile, dominating, globally responsive and sustainable. FCS is the core of this effort.

However, Current

Force upgrades are also essential for increasing the capabilities of all Brigade Combat Teams in an FCS enabled force. In the coming years, the Nation will invest considerable resources to upgrade the Active and Reserve Components to include the Abrams and Bradley fleets as well as the tactical wheeled vehicles fleet. Aging ambulances, M113 command vehicles, and Nuclear, Biological and Chemical vehicles will be displaced throughout the force by Stryker variants. The plan accelerates aviation modernization efforts, as it restructures and standardizes attack and lift formations across the force, and upgrades an additional 96 Apache Attack helicopters in the Reserve and National Guard. Lastly, the Army will pure fleet the Patriot missile force transforming 1980s technology to more lethal missile defense systems. All of these efforts contribute to ensuring that our Army is relevant in the 21st century.

Upgrading and modernizing existing systems allows us to better leverage the Army's considerable investments in its existing capabilities when it

makes sense to do so. More specifically, it allows the Army to extend equipment utility while we work to bridge capacity in new technologies and formations. Modernizing existing capabilities through technology insertions also facilitates Future Force development while we maintain comparative operational capabilities within the Total Force mix.

Modernization is also essential for closing both current and future capability gaps. Without adequately resourced modernization, the Army will not provide significantly improved capabilities, greatly increasing risks to Soldiers now and in the future. To ensure that upgrades align with the prioritization of capability gaps the Army is formally developing an Army Capability Gap list. The ARCIC provides the management structure for identifying capability gaps and describing the operational attributes of proposed solutions. TRADOC's force modernization proposals are reviewed by the Army Staff to ensure integration with Department-wide force management processes and priorities. The Army Requirements Oversight Council (AROC), chaired by the Vice Chief of Staff, exercises the Chief of Staff's approval authority for force modernization initiatives.

### Core Materiel Modernization Programs

Core materiel program modernization upgrades to existing platforms are essential for increasing the capabilities of the Current Force. The Army has a comprehensive plan to upgrade ground combat vehicles to the most modern variants while

# MODERNIZATION STRATEGY

displacing the oldest and least modernized variants with FCS Manned Ground Vehicles beginning in 2015. Leveraging investments in tracked vehicle modernization today is essential for ensuring that the Army increases the capabilities of the Heavy Brigade Combat Teams that will be in service beyond 2030 when the 15th FCS BCT is fielded. By supporting the Abrams and Bradley program upgrades, the Army will maximize the advantages of these current platforms, while augmenting them with advanced digital capabilities found in the most modern variants. These capabilities are essential for maintaining relevance and connectivity in an FCS enabled force.

In the last six years the Army introduced 94 programs at a cost of \$100 billion that greatly enhanced our Soldiers' capabilities on the frontlines of freedom. Maintaining this momentum, the Army will introduce over 64 new programs over the next 10 years to maintain a current qualitative advantage. All of these efforts contribute to

ensuring that our Army is relevant in the 21st Century. A modernization overview of the Army's Core Material Programs is organized in the following sections:

Section 1: Combat Platforms – Maneuver

Section 2: Soldier as a System

Section 3: Aviation Systems

Section 4: Air and Missile Defense

Section 5: Fire Support

Section 6: Chemical, Biological, Radiological and Nuclear Defense

Section 7: Battle Command

Section 8: Battlespace Awareness

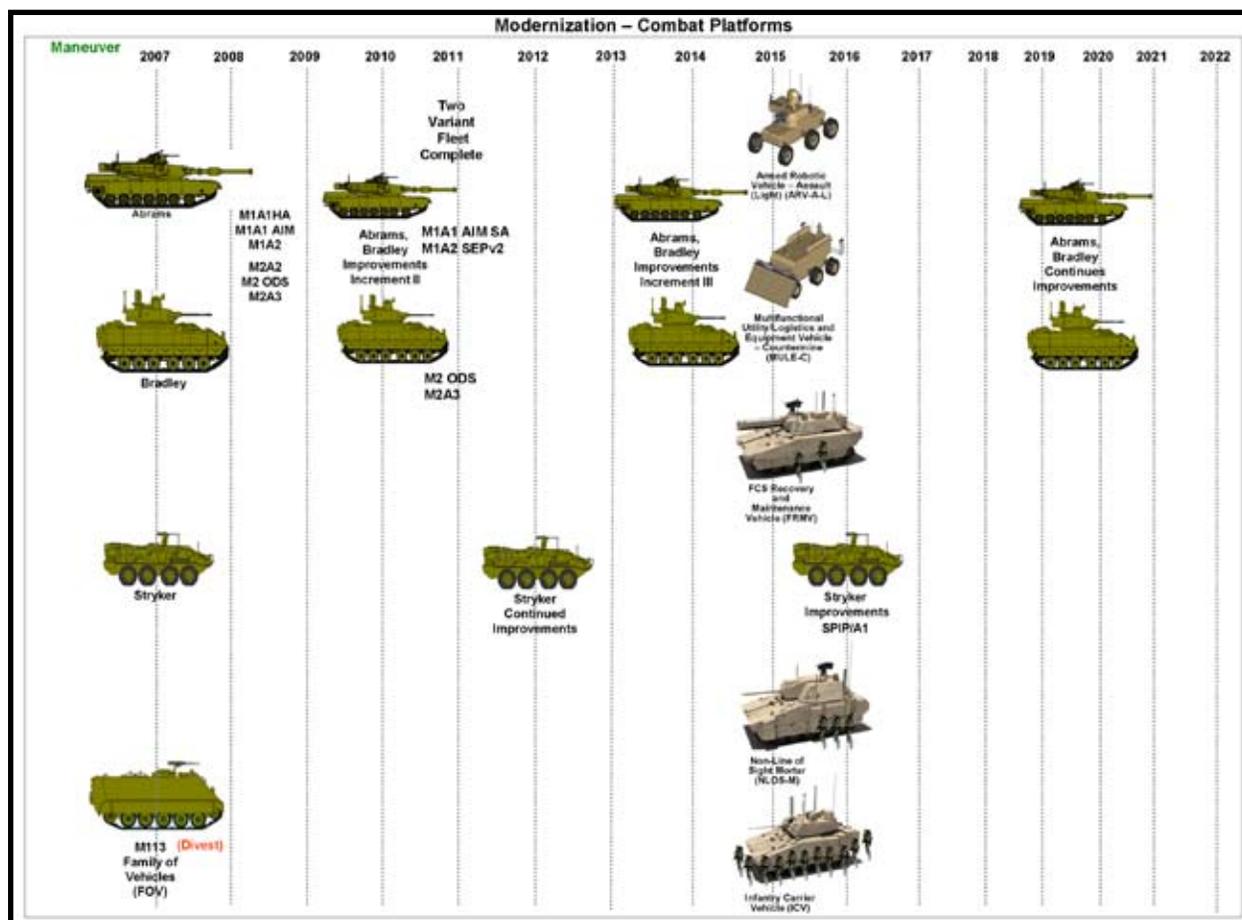
Section 9: Engineer Equipment

Section 10: Tactical Wheeled Vehicles

Section 11: Combat Service Support

Section 12: Army Watercraft

## Section 1: Combat Platform—Maneuver

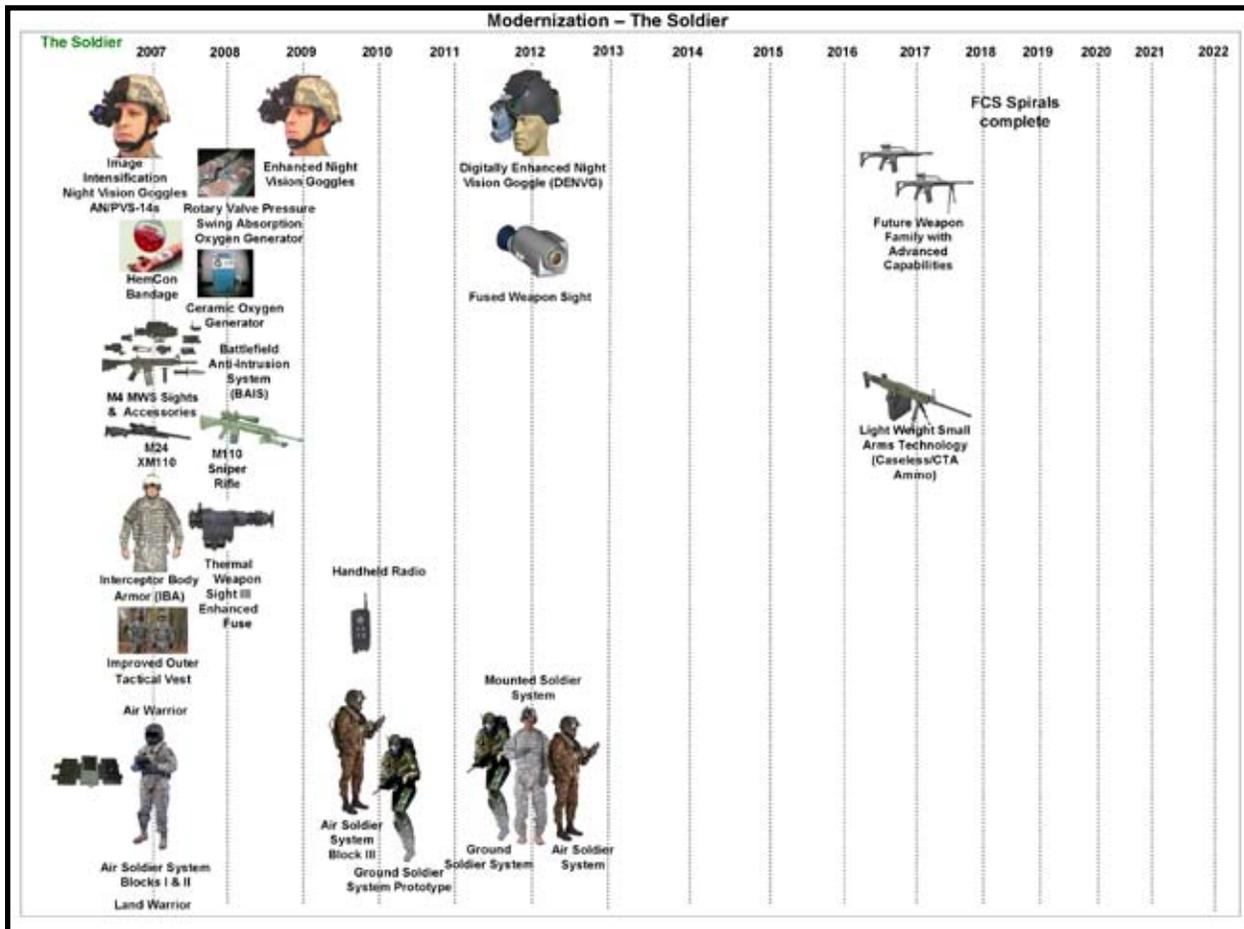


### Combat Platforms—Maneuver Modernization Overview

The Army's Combat Platform modernization is focused on standardizing the Heavy Brigade Combat Teams (HBCTs) with two variants of the Abrams tank and the Bradley Infantry Fighting Vehicle. The Army has almost completed the modularity of the HBCTs which gives every brigade a common structure. The short term modernization goal is to populate these brigades with only two variants of the Abrams and the Bradley. The Abrams M1A2 Sep is being paired with its partner the Bradley M2A3, and the Abrams M1A1 AIM

SA is being teamed with the Bradley M2A2 ODS. This modernization aligns compatible Combat Platforms in common modular formations. The long term goal for the Combat Platforms of the HBCTs and the Stryker Brigade Combat Teams (SBCTs) will be to prepare the Abrams M1A2 SEP, the M2A3 and the Stryker to integrate the network, situational awareness and force protection technology Spin-outs from Future Combat Systems. Integrating these technologies onto the Abrams, Bradley, and Stryker will allow these battle proven platforms to fight in concert with the Future Combat Systems well into the 21st century. Specific program details and status are in Annex A.

## Section 2: The Soldier as a System



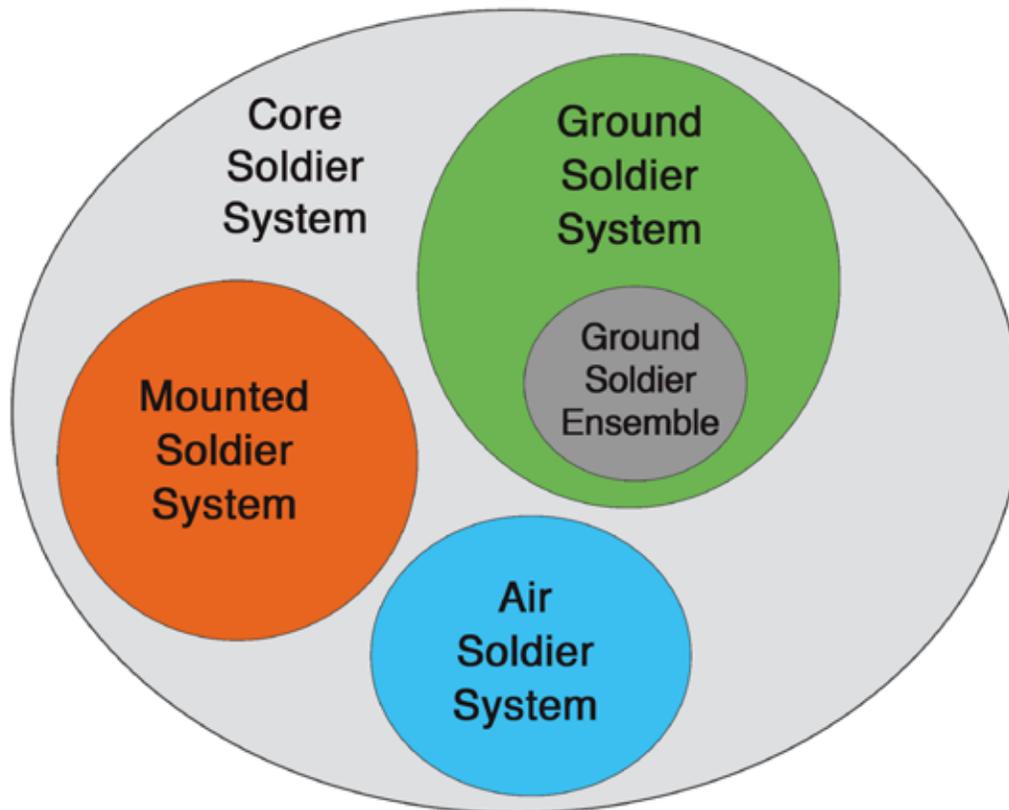
### Soldier as a System Modernization Overview

The Soldier as a System concept is documented in a Joint Requirements Oversight Council approved SaaS Initial Capabilities Document. This ICD serves as the lynchpin for four Soldier capability documents. The first is Core Soldier which establishes baseline capabilities for all Soldiers. Core Soldier consists of clothing bag items, select organizational clothing and individual equipment items required by all Soldiers. The next three capabilities documents are Ground, Mounted and Air Soldier Systems.

The embedded chart on the following page depicts the Soldier as a System concept and the relationships among Core, Ground, Air and Mounted Soldiers.

All Soldiers are equipped with the Core Soldier System, enabling them to train on and perform Basic Warrior Tasks and Battle Drills. When added to the Core Soldier System, the Ground, Air and Mounted Soldier Systems enable Soldiers to perform warfighting functions based on position and role within their unit. For example, the Ground Soldier System provides capabilities to Soldiers who fight dismounted. A subset of Ground Soldiers based on

## Soldier as a System Concept



unit type and normal mission profile are equipped with the Ground Soldier Ensemble which provides voice and data networking capabilities. This allows the Army to provide the right capabilities to Soldiers to meet their specific mission requirements.

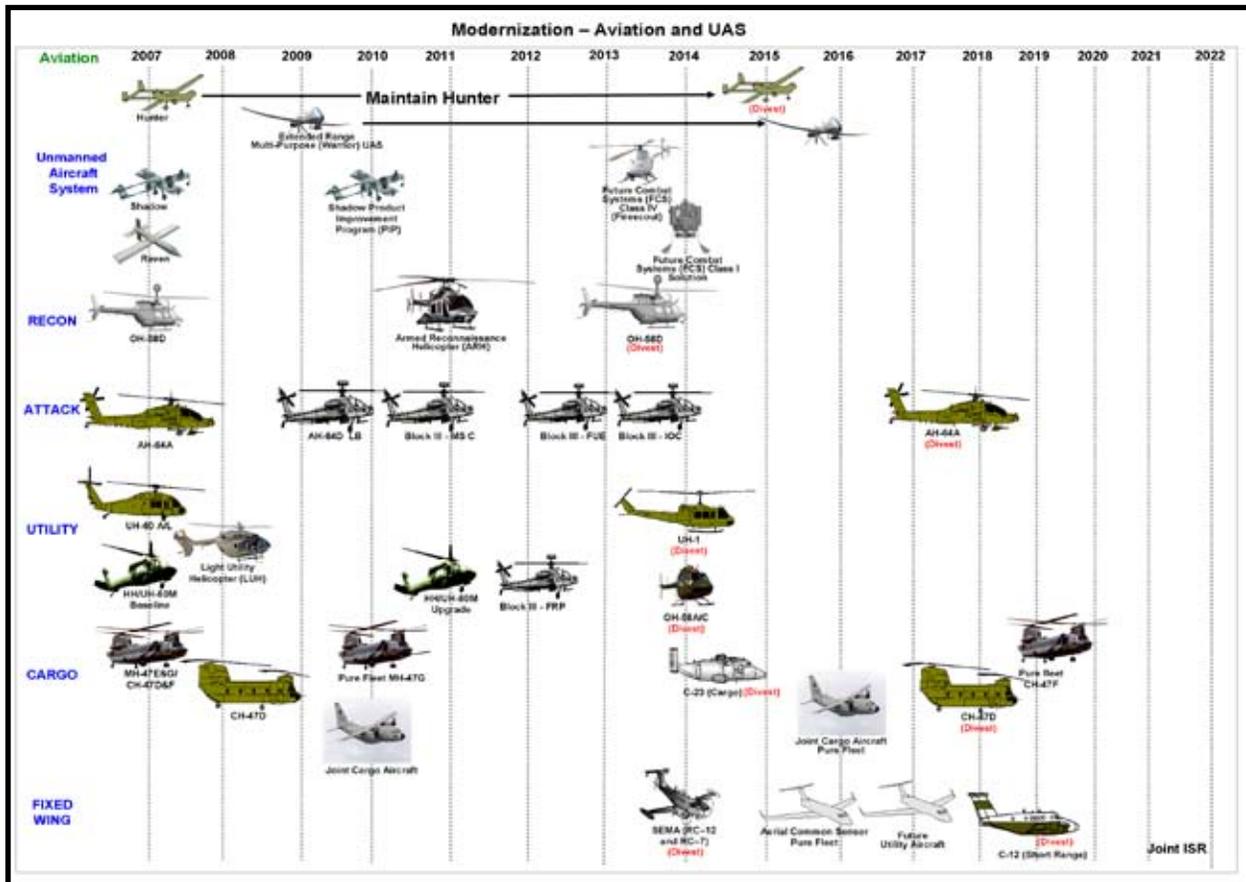
efforts, three years or less, using the most advanced and affordable technology. Specific program details and status are in Annex A.

### Soldier Enhancement Program

Soldier Enhancement Program is a Congressionally sponsored program that uses its funding resources to improve, develop, miniaturize, test or evaluate equipment for military qualification using existing or commercial off the shelf sources. If no available sources of improved equipment exist, the SEP Integrated Process Team initiates appropriate development

# MODERNIZATION STRATEGY

## Section 3: Aviation Systems



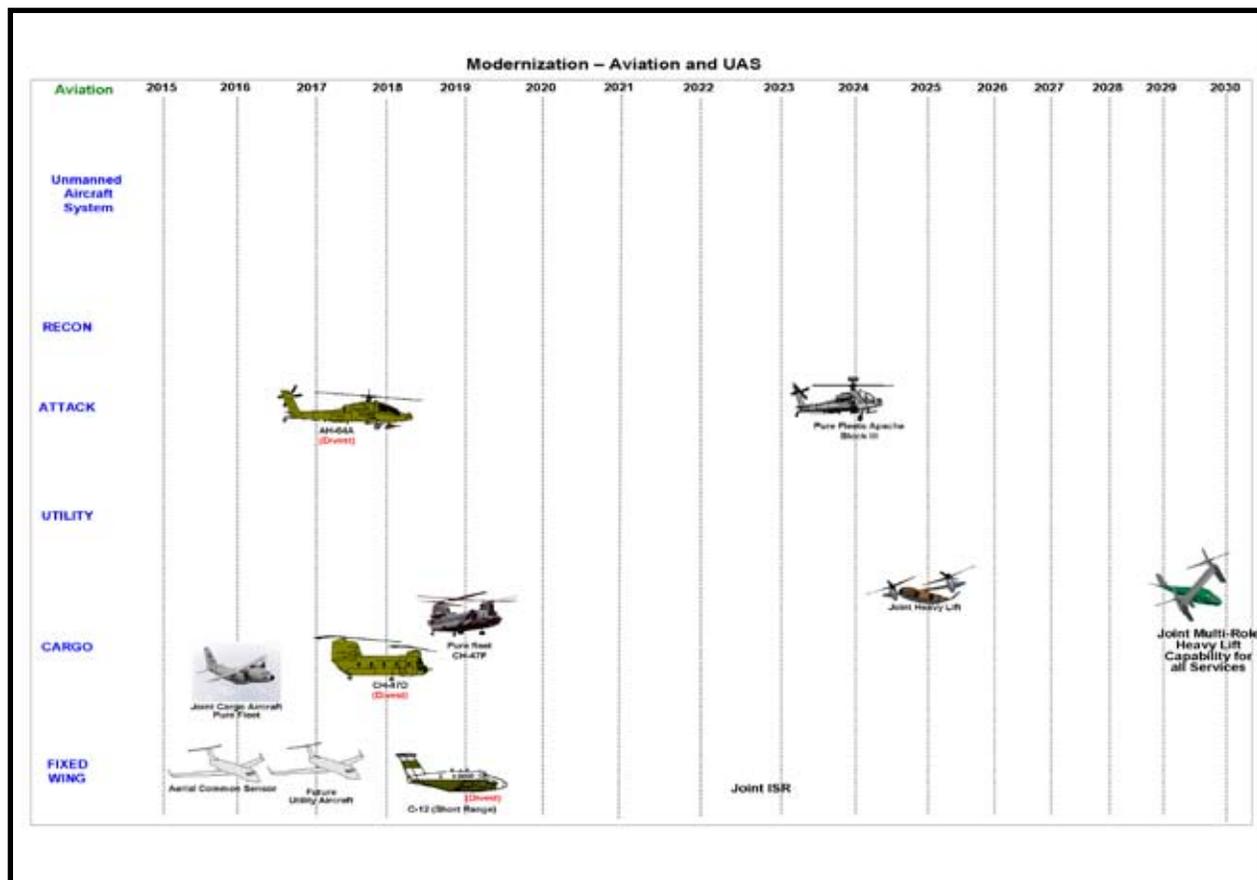
### Aviation Modernization Overview

With its manned and unmanned assets, aviation organizations develop situations both in and out of enemy contact, maneuver to positions of advantage, engage enemy forces beyond their weapons' range, destroy them with precision fires and provide close air support. Their inherent mobility, flexibility, agility, lethality and versatility are instrumental in enabling the air-ground task force commander to conduct decisive Joint operations.

Army Aviation is transforming and modernizing to improve capabilities to meet current and future

fullspectrum aviation requirements. *The Aviation Transformation Plan*, nested in the *Army Campaign Plan*, was developed based on a full DOTMLPF analysis that included the integration of lessons learned from recent operations. The Plan restructures Army Aviation warfighting units into Combat Aviation Brigades, ensuring the aviation units are modular, capable, lethal, tailorable and sustainable. We are fielding a Brigade Aviation Element in every Brigade Combat Team, a BAE(-) in each Stryker BCT and Fires Brigades and converting four Aviation Classification Repair Activity Depots to the Theater Aviation Sustainment Maintenance Group.

## Section 3: Aviation Systems (Continued)



From the reinvestment of Comanche dollars the Army has selected a Light Utility Helicopter, Armed Reconnaissance Helicopter, Extended Range Multi-Purpose Unmanned Aircraft System and the Joint Cargo Aircraft. It has delivered the UH-60M and CH-47F and established programs of record for the AH-64D Longbow Block III and the Small Unmanned Air Vehicle. In fiscal year 2007 we equipped the first units with the LUH and CH-47F. In fiscal years 2008 to 2011 we will begin to field the UH-60M, JCA, ARH, ER/MP UAS and the AH-64D Longbow Block III systems. Modernization and recapitalization of existing aviation systems projected to remain in the fleet into the 2015-30 timeframe are essential to supporting

current as well as future operations. Specific program details and status are in Annex A. The urgent need to address the steadily deteriorating condition of the aviation fleet and accelerate National Guard and Reserve Component modernization is being addressed through an aviation transformation plan which:

- Aligns aviation structure and resources to comply with Future Force requirements, including UAS
- Accelerates aviation modernization efforts across the Total Force
- Restructures and standardizes attack and lift formations across the force

# MODERNIZATION STRATEGY

- Leverages new training technologies to maintain crew proficiency
- Invests in improvements for aircraft and UAS reliability and maintainability
- Procures new UH-60Ms to accelerate fielding of utility aircraft to the Army National Guard
- Procures UH-72As to divest aging UH-1s and OH-58A/Cs primarily found in the ARNG
- Converts an additional 96 AH-64As located in ARNG units to AH-64Ds
- Procures ARHs to divest the OH-58D Kiowa Warriors and converts four ARNG AH-64A battalions to ARH
- Procures the Joint Cargo Aircraft to replace an aging fixed-wing fleet
- Procures ER/MP UAS and SUAS
- Invests in future Joint solutions such as Joint Multi-Role, and potentially a future Joint Medium Lift aircraft
- Continues to upgrade the aviation force with an improved infrared countermeasure suite capable of defeating the most advanced threat man-portable air defense systems
- Converts CH-47D heavy-lift helicopter fleet to the CH-47F model with improved avionics, engines and airframe components

## Future Combat Force Aviation

The Army plans to organize aviation assets into brigade formations at division and corps levels. Teaming UAS with manned systems will enhance operational fires, maneuver and intelligence collection capabilities for the commander. Future Force aviation modernization efforts incorporate lessons learned, the changing operational environment and emerging Joint force requirements. They leverage key technologies in areas such as electronics, communications, automation

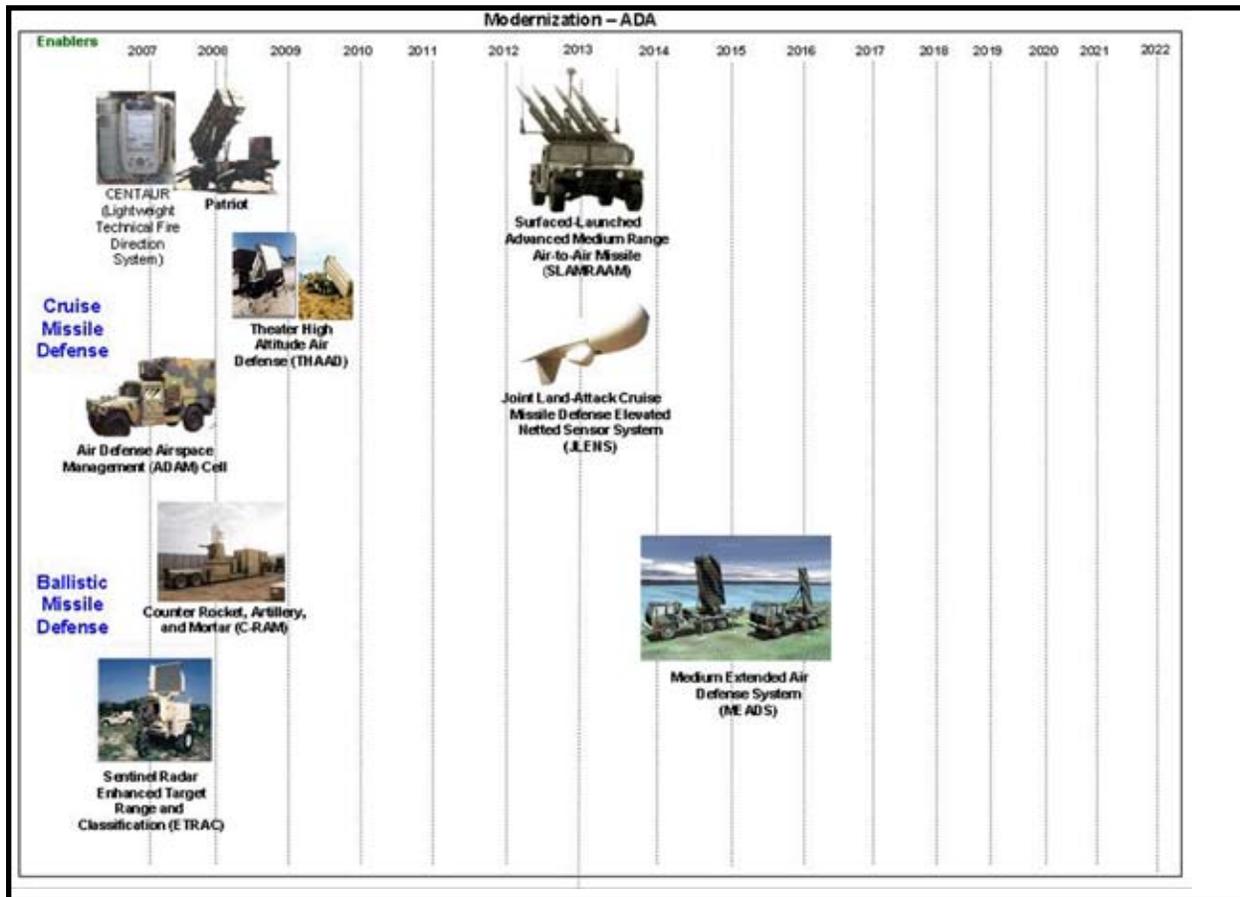
open systems architectures, UAS interoperability, propulsion systems and weaponization. These efforts include:



- Fielding SUAS, TUAV Shadow, Extended Range Multipurpose Warrior and FCS Class I and IV UAS
- Ensuring digital interoperability for effective Joint/combined force operations
- Fielding effective, affordable systems that enhance aviation survivability and improve Soldier stamina
- Improving aircraft operational readiness by leveraging technology to reduce costs and extend aircraft service life; strategy includes pursuit condition-based maintenance plus initiatives such as the aircraft component improvement program, digital source collection and health usage monitoring
- Replacing obsolete air-traffic services equipment and maintaining compliance with future airspace usage requirements
- Digitizing aviation logistics and modernizing aviation ground support equipment and improving training
- Developing the technologies to ensure fielding of unmanned systems, interoperability of manned/

- unmanned aircraft and next generation and future system development
- Leveraging technology to reduce costs, extend aircraft service life and improve training
  - Replacing OH-58D aircraft with the ARH to correct numerous capability gaps (interoperability, survivability, agility, versatility, lethality and sustainability)
  - Procuring new UH-60M/HH-60M aircraft to grow fleet size to meet Modular Force requirements; recap the Black Hawk fleet by reducing the average age of the fleet while providing improved technology that increases reliability, maintainability and sustainability
  - Replacing three aging fixed-wing aircraft (C-12, C-23 and C-26) with the JCA
  - Continual modernization of the AH-64D to a Block III configuration with greater capabilities and increased reliability
  - Remanufacturing 120 A Model Apaches to Apache D Model Block II Longbow configuration
  - Replacing aging UH-1 and OH-58 aircraft with a COTS UH-72A
  - Modernizing the CH-47D heavy-lift helicopter fleet with new-build and remanufactured CH-47F aircraft that incorporate updated avionics and major airframe improvements
  - Procuring the Joint Air-to-Ground Missile as the replacement for the HELLFIRE, TOW and Maverick family of missiles for use by Army Aviation, USMC and USN.

## Section 4: Air and Missile Defense



### Army Integrated Air and Missile Defense (AIAMD) System of Systems Modernization Overview

A relevant and ready AIAMD System of Systems (SoS) capability is crucial to supporting our National Security Strategy. Army Air and Missile Defense (AMD) units use specific systems with unique capabilities to dominate, enable, control or exploit the three dimensional battle space. Transforming Army AMD capabilities so they operate as integrated SoS facilitates the Joint force commander's ability to fully leverage the family of sensors and shooters at his disposal, optimizing their capabilities while mitigating

their inherent limitations as they support the force. This transformation strategy is necessitated by the complex and changing operational environment where increased ballistic and cruise missiles, manned and unmanned aerial vehicles, rockets, artillery and mortars, coupled with WMD payloads are plausible for use against the homeland and from inside and outside a Joint force commander's AOR. AIAMD SoS will require an unprecedented degree of offensive/defensive operations and capability integration within and among Joint force commands. This integration will enable Active AMD to provide a layered defense with multiple engagement opportunities against threats.

The regional fight may be constrained by limited assets due to strategic imperatives, short warning times for deployment, limited lift and immature AORs. The Joint force must mitigate these challenges through offensive/defensive JIIM integration with AMD integrated platforms. AIAMD SoS will contribute to this mitigation by transforming current Army stove-piped, system-centric AMD systems into integrated net-centric AMD system of systems via a command Army AMD Battle Command.

Joint, integrated AMD is a critical warfighting requirement that protects our homeland, deployed forces, friends and allies. This capability is achieved through an effective SoS application and synergy consisting of sensors, shooters and battle managers. Integrated Battle Command provides the IAMD SoS backbone. With the ability to provide fused, near real-time information with integrated fire control quality data, AIAMD SoS will be able to support key AMD capabilities such as Beyond Line of Sight and wide-area engagements. Currently, there is no Battle Command System that can provide fire control quality data throughout the Joint IAMD SoS network. As Joint net-centric enablers such as Joint SIAP or Joint IFC capability are developed, they may eventually provide a single AMD Battle Command solution among the Services and the Joint force. These Joint enablers will be integrated into the Army's IAMD SoS architecture as they become available and eventually integrated into Joint AMD programs of record.

The AIAMD SoS is designed to offset Army and Joint Service-specific systems limitations by enabling engagements to kinematics ranges, support the creation of a common operational air picture, contribute to persistent wide-area surveillance and detection and expand the protected battle space.

The AIAMD SoS program is synchronized with other Services and in many aspects is leading the way to develop a Joint force AMD SoS to counter ballistic missiles, cruise missiles, manned and unmanned aircraft, tactical air-to-surface missiles, rockets, artillery and mortars.

As the AIAMD SoS matures, the traditional system-centric paradigm that has driven AMD DOTMLPF will experience a corresponding evolution. The AMD force will continue to possess specific systems (Patriot and MEADS), which comprise shooters, sensors and battle managers. However, the pursuit of SoS has given rise to a conceptual construct of shooters, sensors and battle managers that will profoundly affect how Army DOTMLPF supports AMD. A mature AIAMD SoS will ultimately possess a common battle manager that will be supported by plug-and-fight shooters and sensors integrated into a network-centric Fire Control Quality Engagement Net. Our AMD units will be supported by Soldiers proficient in operating and maintaining Integrated Battle Command System, and a suite of shooters and sensors.

To prepare for these challenges, Army Air Defense is changing the way it organizes and fights with the development of composite ADA units that are modular, multifunctional and more readily provide the spectrum of AMD combat potential. These units offset the limitations of a single system, significantly increase the effectiveness of the area air defense commander's defense design, enhance modular or task force operations, reduce the limitations created by autonomous operations and conditions that have led to past fratricide, and increase the engagement battle space against AMD threats.

The ADA organizational vision is fully embedded with the Modular Army Future Force vision. All forces are

considered pooled and available to support any future JIIM headquarters with mission-tailored packages. Army ADA transformation will optimize the synergy between AC and RC forces to meet the requirements inherent in the Joint Operating Concepts.

Unit transformation began with battalions but stretches across all Army ADA echelons. Today, the Active Army ADA forces consist of nine Patriot Pure Battalions, and six composite battalions. The six composite battalions include a Headquarters and Headquarters Battery with a C2 system to integrate command and control of Patriot and Avenger capabilities, four Patriot batteries with six launchers per battery and one avenger battery with 24 Avengers. Also included in the Active Force is one Maneuver AMD Avenger Battalion with 36 Avengers. The National Guard has six MAMD Battalions with 36 Avengers each. Beginning fiscal year 2009 all active Avenger weapon systems will convert to SLAMRAAM, fielding one composite battalion at a time, with the pure MAMD battalion scheduled last for conversion, planned for fiscal year 2017.

When fielded, THAAD will reside at the AMD BDE level and may be task organized to AMD Composite or Patriot Pure Battalions. ADA batteries or battery teams will be the primary battle elements to achieve effects on the battlefield from tactical to strategic levels. They can rapidly deploy, achieve one or more required lethal effects without augmentation and sustain unit operations. They can fight independently but generally will serve as subordinate, multifunctional AIAMD task force elements. All AIAMD combat units will be pooled at the theater-level under AIAMD brigades available for rapid integration into corps or division

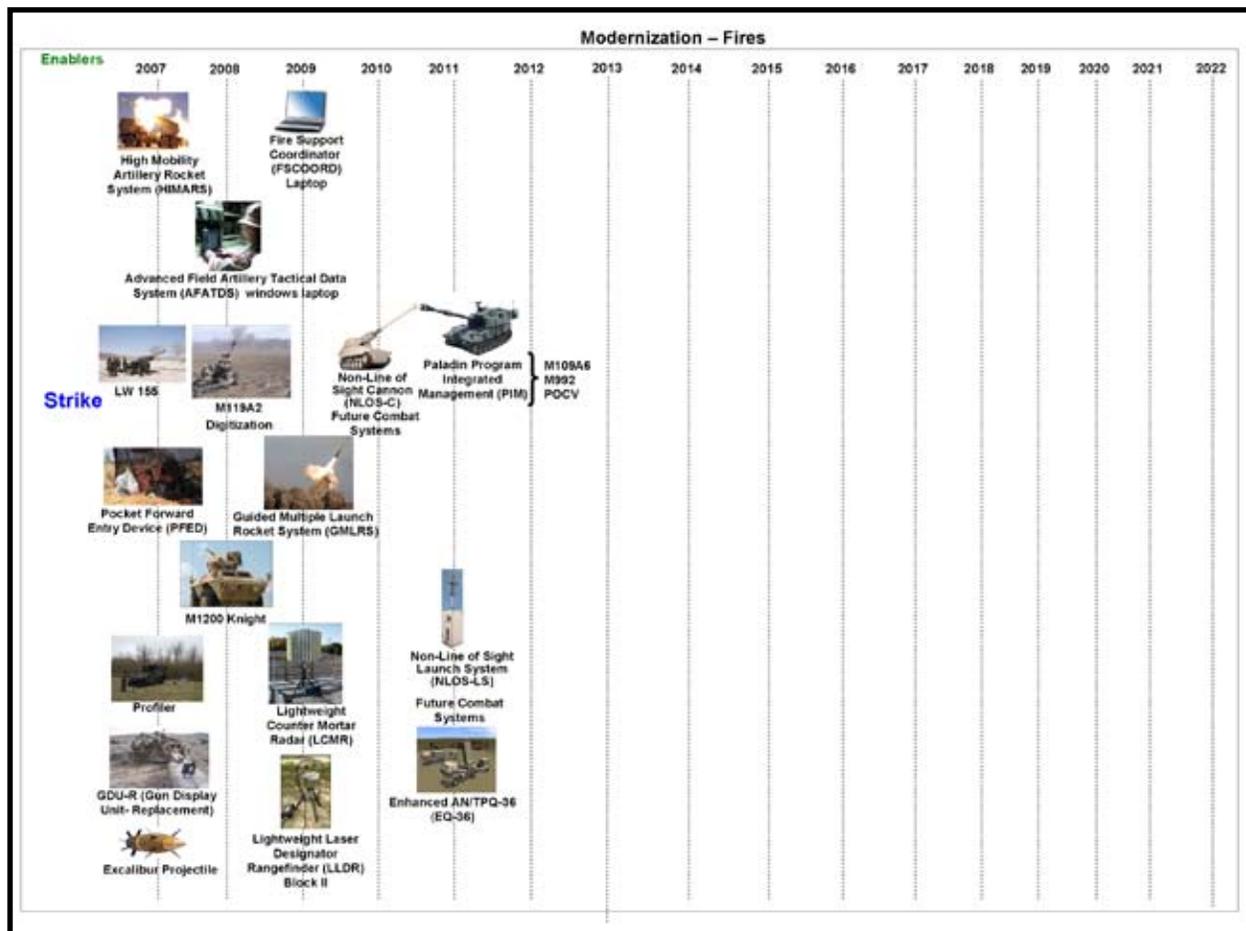
formations, in support of BCTs as the operational/threat environment requires. Specific program details and status are in Annex A.

## Army Air and Missile Defense Command

Senior Army ADA Battle Command headquarters at the theater level, and commands ADA brigades assigned to operate at that level. As a new structural approach, AAMDC has, in concert with the Joint force's area air defense commander, overall mission responsibility for the planning, integration and execution of Army AMD operations. AAMDCs are theater focused headquarters. The two Active Component AAMDCs conduct frequent, short-notice deployments in support of USPACOM and USCENTCOM. The Reserve Component AAMDC is focused on defense of CONUS in support of USNORTHCOM and complements Theater headquarters in the other geographic Combatant Commanders' AORs. THAAD and JLENS batteries, along with their supporting command and maintenance units, will be assigned to regionally focused ADA brigades.

In summary, by using a plug and fight architecture that is enabled by an integrated Battle Command system, the AIAMD SoS optimizes the employment of current and future AMD systems in a given theater of operations. The modular, component based nature of this capability allows for a flexible, tailorable AMD force that can be tasked organized across multiple echelons to address the full spectrum of 3rd dimensional threats employed against JIIM forces.

## Section 5: Fires Support Modernization



### Fires Support Modernization Overview

Precision Strike is moving rapidly to achieve 21st Century Fires Support modernization, while simultaneously fighting the Global War on Terror.

The High Mobility Artillery Rocket System began fielding in 2005, and will complete Army wide fielding in 2013. The HIMARS provides Joint early entry forces, SOF, and BCTs with an indirect fire launch platform that provides extremely lethal, responsive, continuous, and all-weather, precision medium- to long-range rocket and missile fires to a depth of 300 kilometers.

The Meteorological Measuring Set- Profiler AN/TMQ-52, began fielding in 2004, and will complete Army wide fielding's in 2012. Profiler provides a modernized, near real time meteorological capability for a wide range of indirect fire weapons and munitions over a 60 kilometer battle space with potential to extend coverage to 500 kilometers of battle space.

The Improved Position Azimuth Determining began fielding in 2004, and will complete Army wide fielding's in 2010. IPADS supports modernization of the Army's Field Artillery survey capabilities and provides exact position and directional data that is more accurate than that which is available from GPS.

# MODERNIZATION STRATEGY

Fire Support Command and Control is AFATDS, plus the four associated hand-held Computers that support AFATDS. FSC2 automates the process of Fire Support Coordination. Fire Support Coordination is the planning and execution of fires so that a weapon or group of weapons adequately covers targets. FSC2 functions at firing platoon thru Echelons Above Corps.

The M777A2 Lightweight 155-millimeter HOWITZER began fielding in 2006, and will complete Army wide fielding in 2013. The M777A2 provides the Army with an advanced, towed, lightweight 155-millimeter howitzer, with self-locating and aiming capability that meets increased operational thresholds for mobility, survivability, deployability and sustainability.

The Lightweight Counter Mortar Radar AN/TPQ-48 was originally developed for the U.S. Special Operations Command in response to a 1999 MNS described by the 75th Ranger Regiment for automatic location of indirect fire weapons, with emphasis on mortars.

The M1200 KNIGHT began fielding in 2006, and will complete Army wide fielding in 2013. It is the natural progressive improvement to its predecessor the HMMWV based M707 KNIGHT. The M1200 KNIGHT

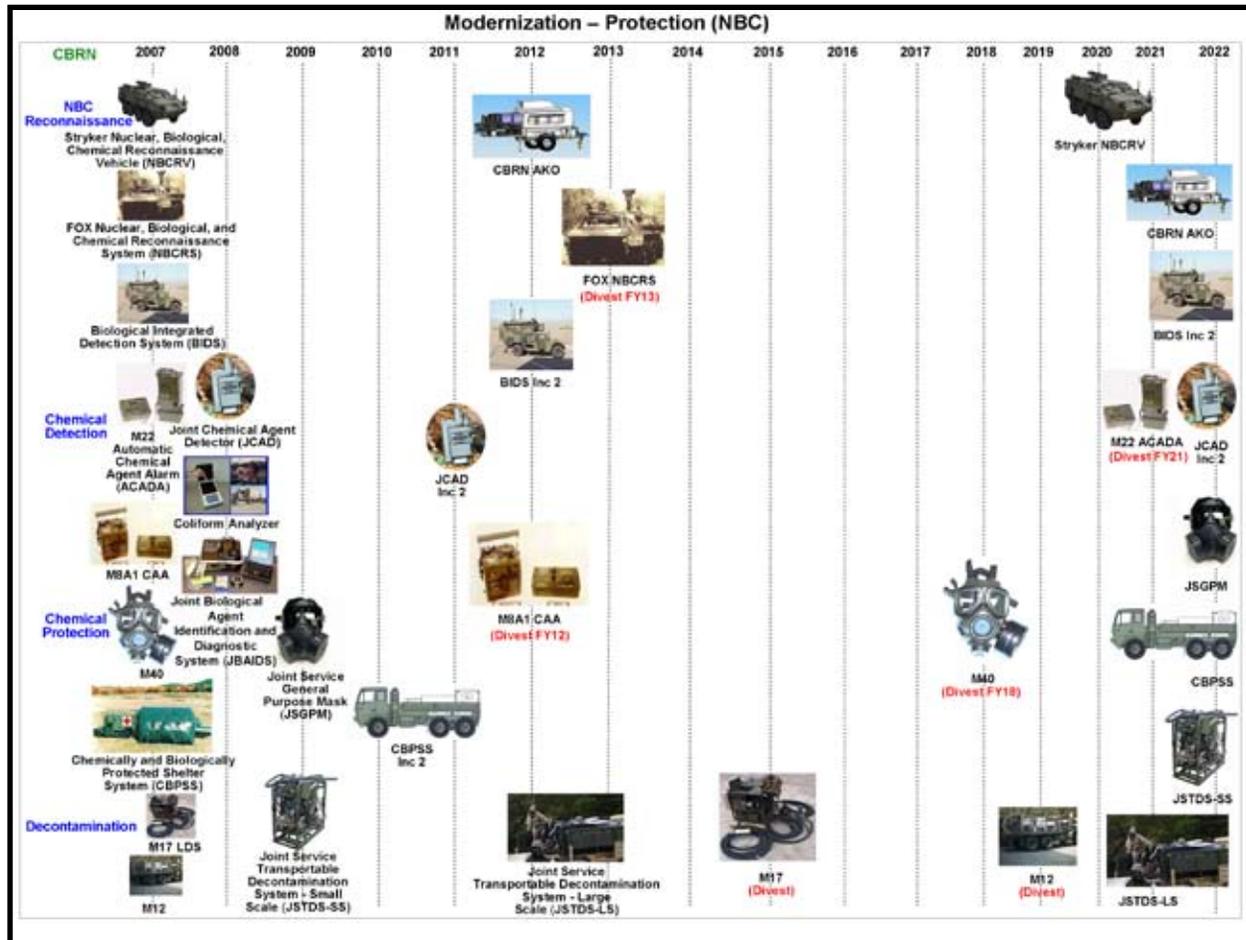
is built upon an Armored Security Vehicle chassis which retains the essential mobility required for our Combat Observation Lasing Team operations while providing the increased force protection needed in theater today and for projected future operations.

The Guided Multiple Launch Rocket System began fielding in 2003, and will complete Army wide fielding in 2019. The GMLRS munitions are the Army's primary organic Joint Expeditionary, all-weather, all-terrain, 24/7, tactical range precision guided rockets employed by modular Fires Brigades supporting Brigade Combat Teams, Joint Expeditionary Force and Joint Special Operations Force Combatant Commands.

The Lightweight Laser Designator Rangefinder began fielding in 2005, and will complete Army wide fielding in 2014. LLDR provides Infantry, Stryker and Heavy BCTs with ability to locate, identify and designate during day and night to provide combat overmatch in symmetrical and asymmetrical environments.

The EXCALIBUR cannon munition began fielding to US Forces in Iraq in May of 2007. Excalibur provides improved fire support through a precision-guided, extended range, collateral damage-reducing and more lethal family of artillery projectiles. Specific program details and status are in Annex A.

## Section 6: Chemical, Biological, Radiological, Nuclear (CBRN) Defense

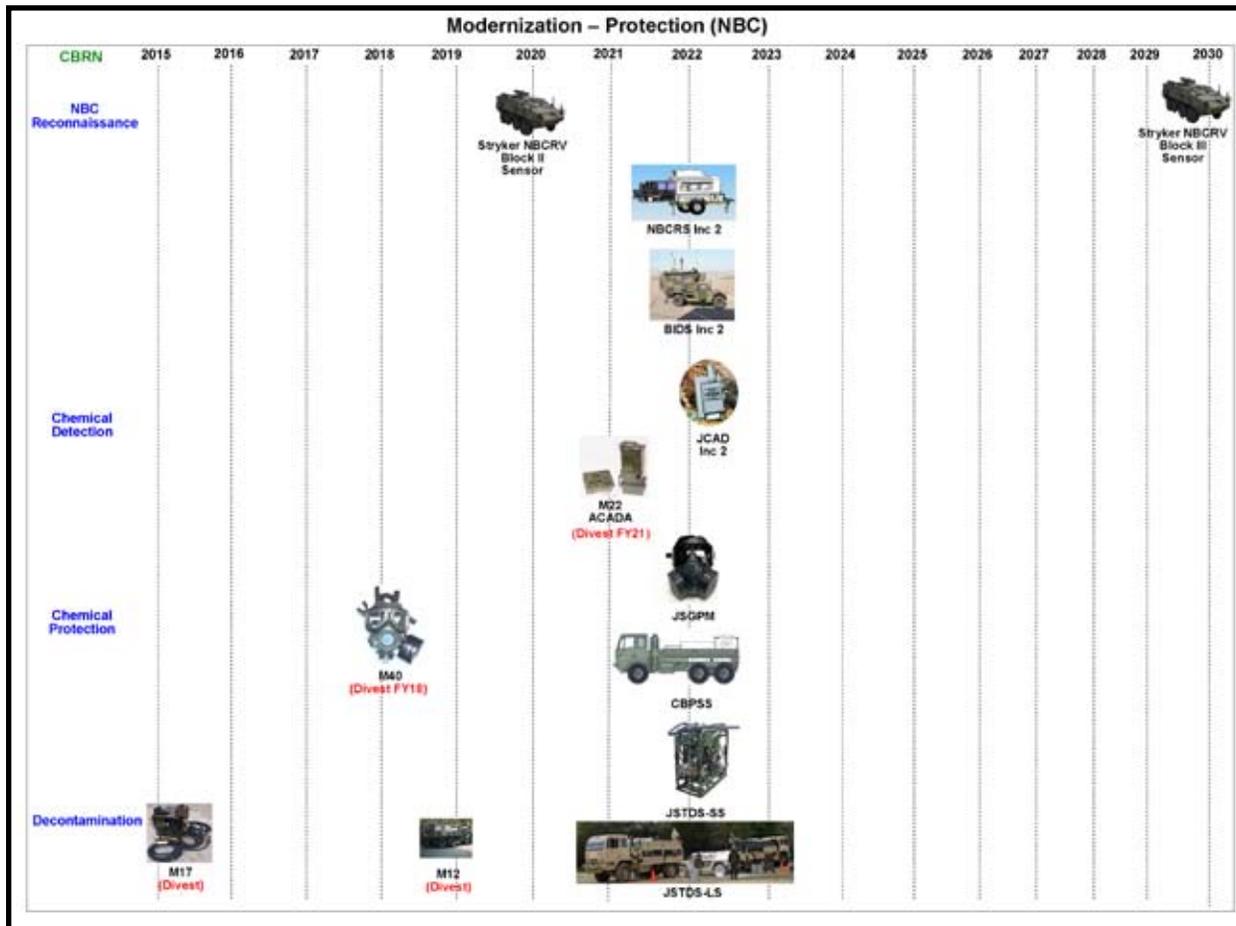


### CBRN Defense Modernization

The Army's concept to employ focused defense against Chemical, Biological, Radiological, Nuclear weapons enables units to operate at the lowest required protective posture without increasing risk to Soldiers. CBRN reconnaissance and surveillance units, with their point and standoff detectors and battle management/C2 procedures, are the principal means of contamination avoidance. This protection extends throughout the full spectrum to include homeland defense. The Army augments installation commanders with the ability to respond to terrorist

and CBRN attacks through equipping and training. CBRN defense systems, obscurants, and their enabling technologies help the Army fully achieve force protection, information dominance and full-dimensional protection in a WMD environment. The Army's CBRN defense strategy is to employ a focused defense against CBRN threats so that only units directly affected by the hazard would be warned to take protective measures. Using focused defense, large numbers of units no longer assume full protective posture as a precautionary measure.

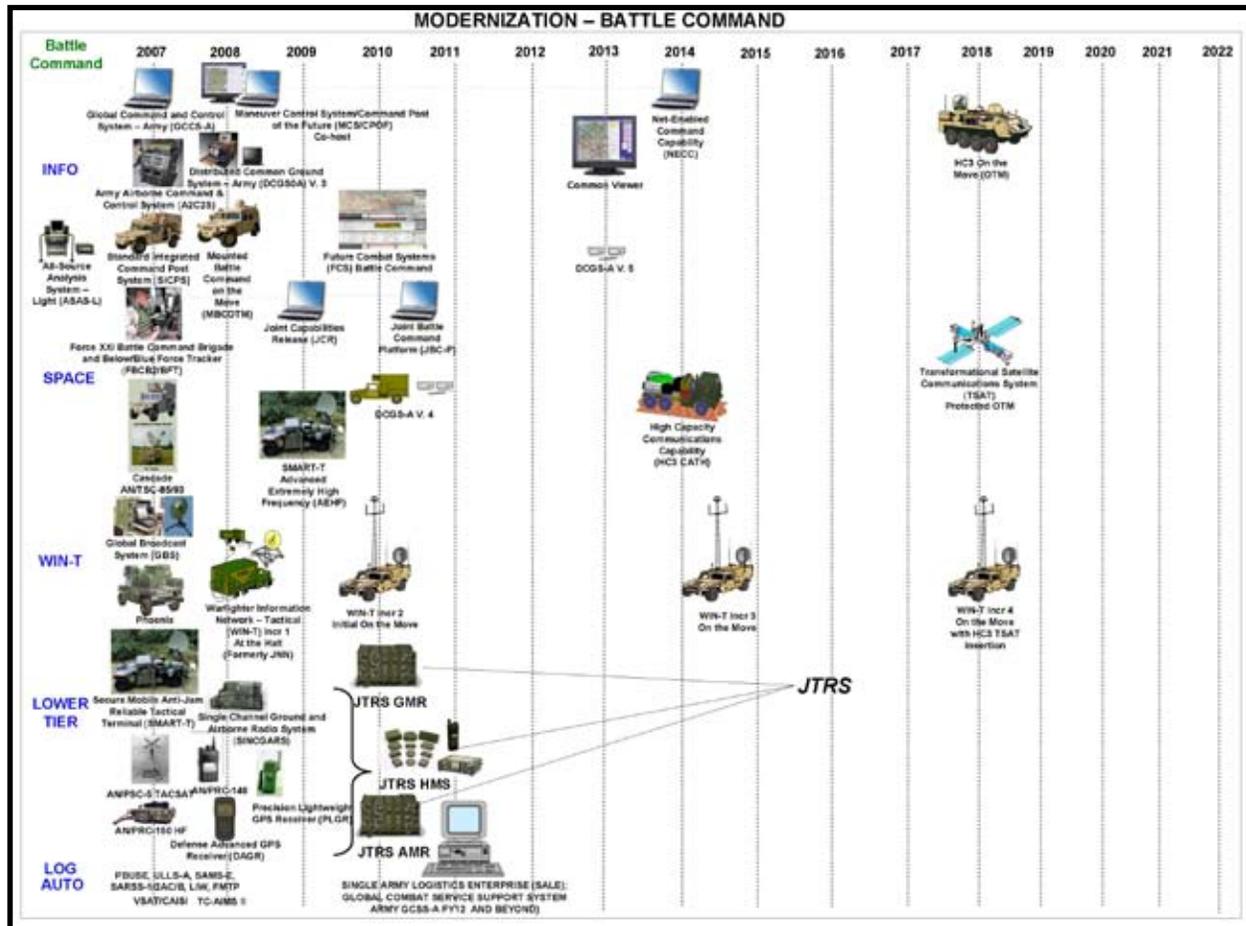
## Section 6: Chemical, Biological, Radiological, Nuclear (CBRN) Defense (Continued)



In addition to providing the means of general CBRN defense and obscuration common to all units, the Army provides increased CBRN defense and obscuration capabilities with specialized chemical units. With their point and standoff detectors, CBRN reconnaissance and surveillance units are the principal means of contamination avoidance. Biological detection units provide capabilities to shorten response times to initiate the medical response to the growing threat of biological warfare agents. Decontamination units restore combat power after resources are contaminated.

The vision of the Army's CBRN defense modernization effort is to enable the commander to minimize casualties and preserve combat power in a CBRN environment and to create information superiority by using C2 information systems and obscurants. Operationally, our mission is to defend against a CBRN attack with minimal casualties and degradation, allowing commanders to quickly restore full combat power and continue their mission across the full spectrum of operating environments. Specific program details and status are in Annex A.

## Section 7: Battle Command



### Battle Command Systems Modernization Overview

Battle Command is: “the art and science of understanding, visualizing, describing, directing, leading, and assessing forces in operations against a hostile, thinking and adaptive enemy. Battle Command applies leadership to translate decisions into actions—by synchronizing forces and warfighting functions in time, space and purpose—to accomplish missions.” Battle Command Information Systems are the equipment and facilities that collect, process, store, display and disseminate information. These

include computers—hardware and software—and communications as well as policies and procedures for their use.

LandWarNet consists of globally interconnected, end to end Army warfighting capabilities, associated process and personnel for collecting, processing, storing, disseminating and managing information on demand to support warfighters, policy makers and support personnel. It enables Battle Command capabilities. Focused on leaders and Soldiers—LandWarNet integrates command and control capabilities to enable leader—centric operations.

# MODERNIZATION STRATEGY

Army Battle Command modernization will field integrated information technology and achieve warfighting advantages through the comprehensive networking of informed, geographically dispersed, modular forces. This integrated Battle Command combined with corresponding changes in DOTMLPF will allow our future land forces to remain dominate across the full spectrum of operations. The 2004 National Military Strategy and 2006 Quadrennial Defense Review directed the Services to become more “agile” (rapidly deployable, highly mobile, self-sustained, and full spectrum capable) and “fully networked” (information-based and integrated across the Joint forces). Additionally, DoD has mandated that the Global Information Grid, (GIG) will be the primary technical framework to support Network Centric Warfare/Network Centric Operations. Under this guidance, all advanced weapons platforms, sensor systems and command and control centers will eventually be linked into the GIG. This represents a fundamental shift from developing separate systems to achieve new or improved capabilities to a “system of systems” integration approach, through massive integration efforts. The following four primary tenets will be used:

- A robustly networked force improves information sharing
- Information sharing enhances the quality of information and shared situational awareness
- Shared situational awareness enables collaboration and self-synchronization, and enhances sustainability and speed of command
- Mission effectiveness is dramatically increased by the above three tenets

Army Battle Command modernization will incorporate these tenets across all echelons to the individual Soldier as we migrate to our Future Force Battle Command.

We face adaptive enemies who employ a full-range of conventional and asymmetric tactics in complex environments. This challenge highlights a critical need to improve the vertical and horizontal integration and dissemination of Battle Command capabilities rapidly, both within the Army and between Services in the Joint environment as well as between agencies and nations in the Inter-Agency and Multinational environments. We can't afford to have a collection of forces from each Service operating independently in the same geographic area. Interoperability is the ability of systems, units, or forces to provide data, information, materiel and services to and accept the same from other systems, units or forces and to use it to operate effectively together.

Our Future Force network consists of five layers (Standards, Transport, Services, Applications and Sensors and Platforms) that, when integrated, provide seamless delivery of both data and knowledge. The integration of all five layers is necessary to provide greater situational awareness, sensor fusion and networked fires; transforming our ground forces' ability to dominate in land combat. Key systems being integrated include:

- Common standards and protocols, e.g. Net Centric, waveforms, IP; Common Hardware between the Army Modular Forces and the Joint force
- Net-Ready Transport systems such as Warfighter Information Network-Tactical, Joint Tactical Radio Systems, High Capacity Communications Capability and Transformational Satellite Communications System
- Net-Ready Services will be provided by FCS System of Systems Common Operating Environment, Net Centric Enterprises Services, Win-T, and FCS network management services

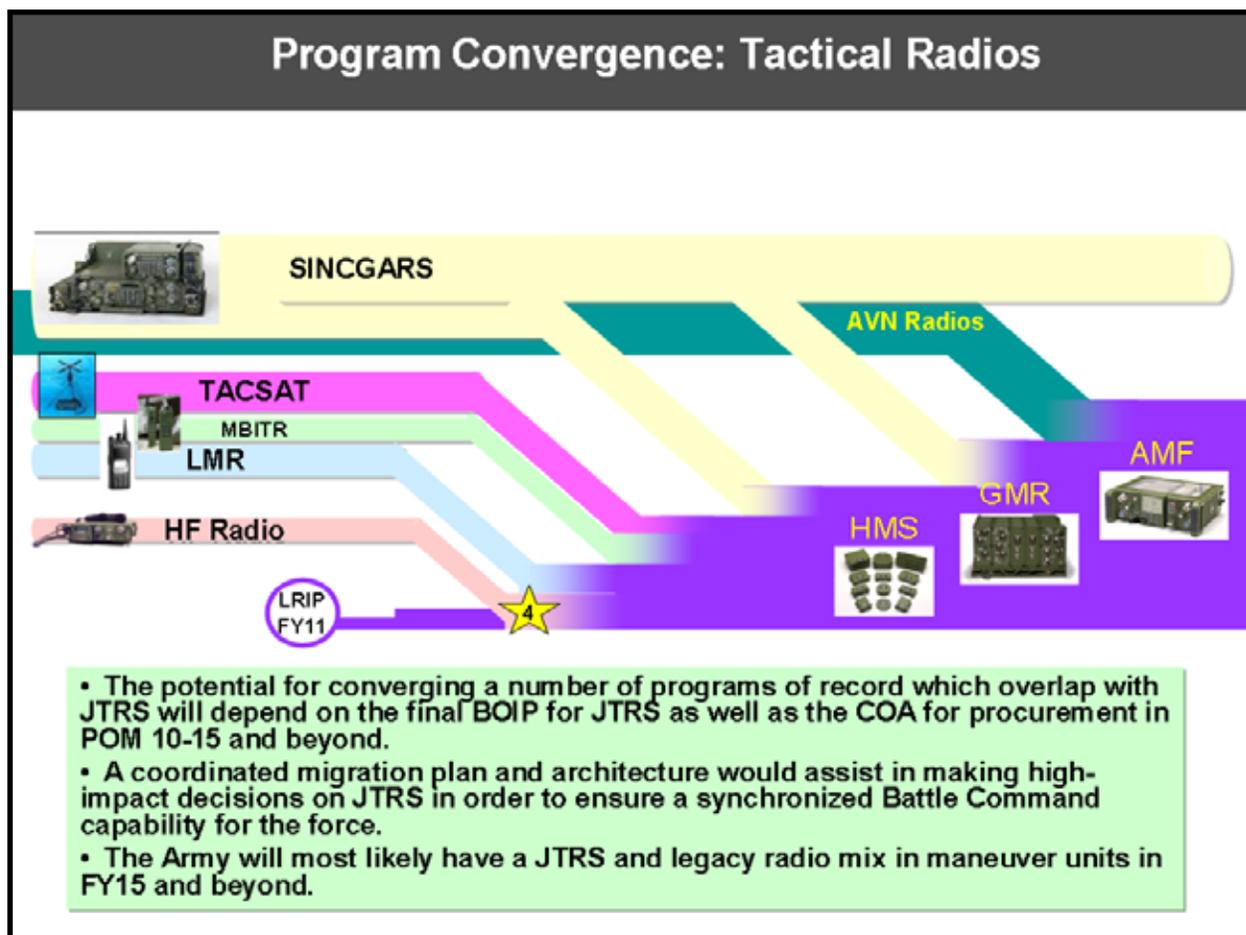
- Future applications include FCS Battle Command, Net-Enabled Command Capability, and Distributed Common Ground System – Army
- A wide range of sensors on unmanned ground platforms, unmanned air platforms, and manned platforms networked and fused are critical for greater situational awareness

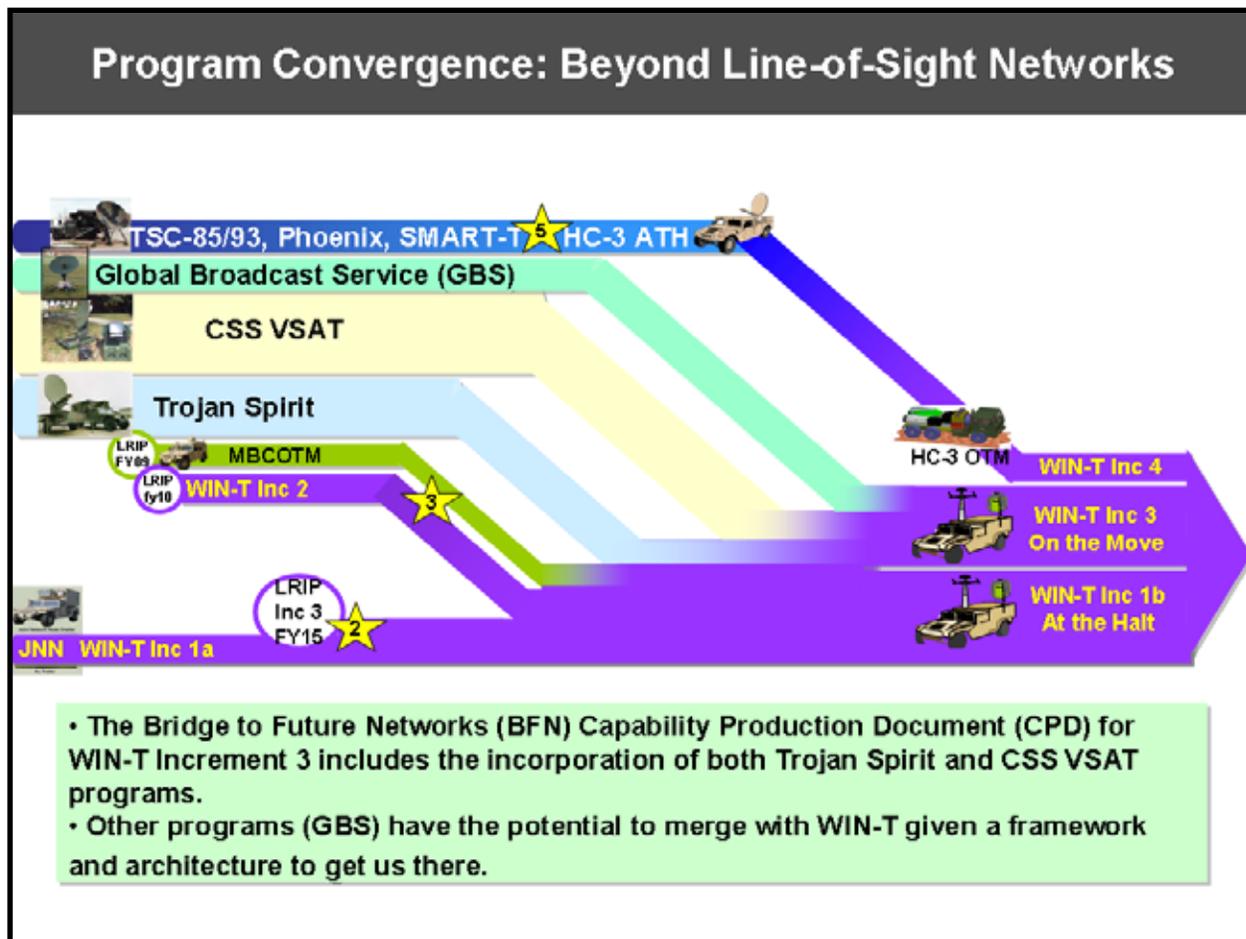
Again, integration of all these layers is the key to providing LandWarNet from the dismounted Soldier to mobile command posts and sustaining bases.

The Army supports the DoD vision of net-centricity with the ultimate goal to improve the ability of our systems to work together. Another way to say this is to reduce the number of seams among systems and organizations. Our vision is to develop robust networking solutions

that enable commanders, leaders and Soldiers to access critical data and information anywhere, anytime and to create a global environment where Soldiers and leaders have the same look and feel when accessing information from home station, through training bases to deployment. We are accomplishing this by migrating existing systems where possible and developing new Net-Ready programs to meet the unique challenges of ad hoc networking and command and control of land forces on the move. Early steps in the transition will be accomplished through the fielding of new Battle Command capabilities to the Current Force units in the FCS Spin-outs beginning in 2010.

The following charts outline the convergence strategies for Battle Command equipment. A key part of the Army's overall strategy for Battle Command Systems



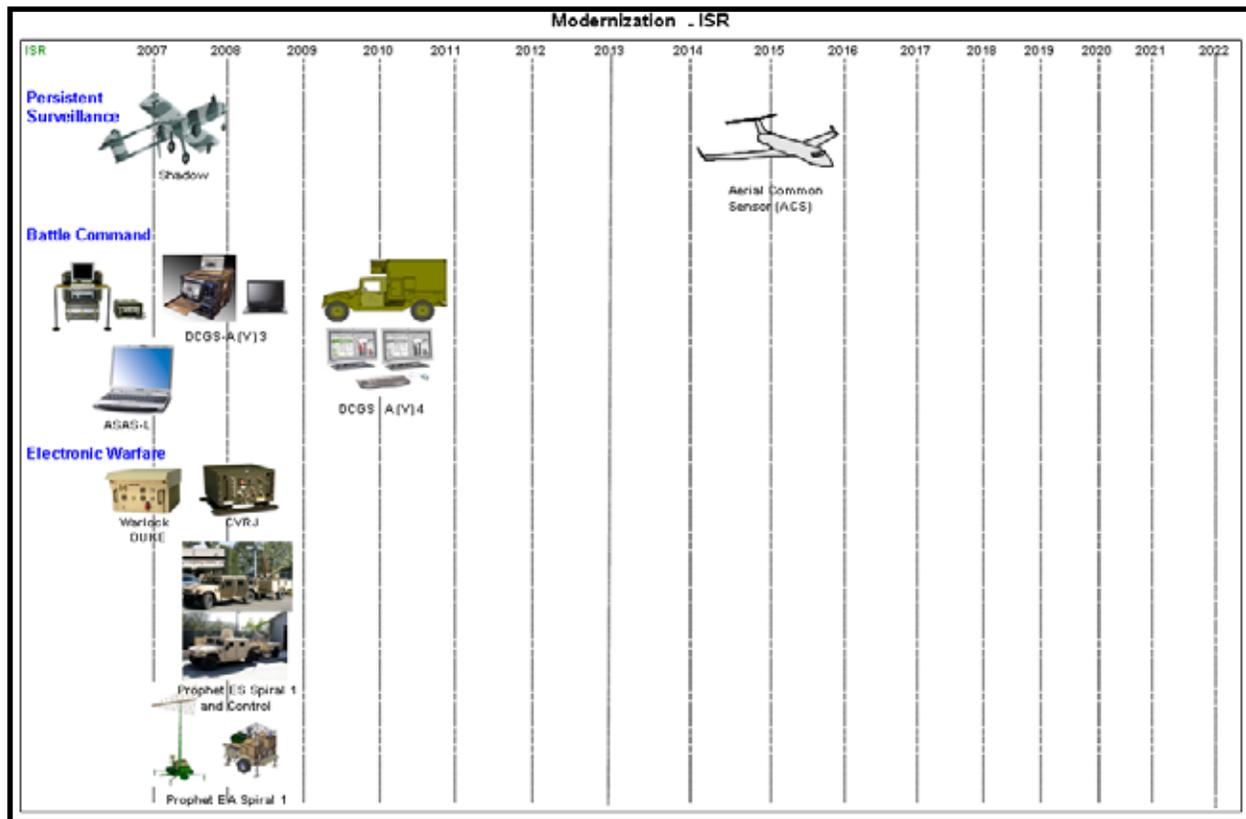


is to move beyond the era of new stove piped capabilities and to converge on multi-functional, multi-supportive, mainline Army communications systems. On the lower tier, the strategy calls for the convergence of multiple and varied tactical radio systems into the Joint Tactical Radio System (JTRS) family of radios. This convergence will rely on a number of factors, including the final basis of issue for JTRS, radio cost, C4I funding availability and an architecture which seamlessly and successfully converges the radios into JTRS in the fiscal year 2015 to 2020 timeframe.

For Beyond Line-of-Sight Networks, the proliferation of special-purpose, incompatible communications systems on the battlefield creates special problems

for support and integration agencies. The Bridge to Future Networks Capability Production Document for Warrior Information Network-Tactical (WIN-T) Increment 3 included the incorporation of both the Intelligence community's Trojan Spirit as well as the Logistical community's Combat Service Support Very-Small Aperture Satellite (CSS VSAT) programs. While this is the immediate challenge for the Army, other special purpose systems such as Mobile Battle Command On the Move (MBCOTM), Global Broadcast Service (GBS) and others present the potential for systems convergence into WIN-T, thereby simplifying support and integration tasks and moving the Army closer to a truly network-centric capability. Specific program details and status are in Annex A.

## Section 8: Battlespace Awareness Modernization



### Battlespace Awareness Modernization Overview

Battlespace Awareness (BA) materiel systems collect and disseminate data to support development of situational awareness and situational understanding. BA Programs require reliable communications to support the collection and dissemination of data. Decision makers require current BA to support decision making, including National-Policy, Strategic Planning, Combat Commanders, operations centers, platforms, and individuals. For the Army, Reconnaissance, Surveillance and Target Acquisition / Intelligence Surveillance and Recon (RSTA/ISR) is the full spectrum combined arms mission that integrates ground and air capabilities to provide effective, dynamic, timely, accurate and assured

combat information and multi-discipline actionable intelligence for lethal and non-lethal effects/decisions in direct support of the ground tactical commander. Command and Control of BA assets, synchronizing RSTA/ISR with operations, tasking and dynamically re-tasking assets, monitoring/tracking assets and activities, planning and assessing operations support the development of situational awareness and situational understanding. Observation and collection of data provides surveillance of broad areas; focuses on targets of interest; finds, identifies and tracks needs and measures and monitors environmental conditions. Critical aspects of BA include identification of enemy courses of action, integrating enemy and friendly data and information

on cultures, social issues and resources. BA is critical to support automatic target recognition, employment of human resources, distributed processing, data fusion, analyst collaboration, distributed archives, collaboration between analytic centers, identification of enemy patterns of behavior and defeating denial and deception. Specific program details and status are in Annex A.

The Army is transforming while at war to provide enhanced BA capabilities and highly trained Soldiers and civilians in support of Army, Joint, and combined operations worldwide. The current and foreseeable strategic environment in which our Soldiers will operate is an era of persistent conflict. We will continue to fight highly adaptive, smart enemies, who rapidly incorporate off-the-shelf technology to conduct asymmetric operations. Joint and multi-national operations will be fought in complex operating environments where the enemy will attempt to maintain anonymity among the population. A 24/7 worldwide media, the global internet, powerful networks, technological innovation, ideological and cultural differences, combined with extended borders and distances, are challenges our warfighting formations will face. This environment will exact an increasing demand on Army Intelligence combat operations in Afghanistan and Iraq, as well as sustained operations in Korea and elsewhere, clearly demonstrating the critical need for increased Military Intelligence (MI) capabilities within brigade combat teams and maneuver battalion, where the risk is greatest.

Ongoing MI transformation efforts enable Soldiers to fight “among the people” in complex operating environments, integrate advanced fusion and “find, fix, finish, exploit and analyze” capabilities into Battle Command processes at BCT, battalion, and company levels. Aggressive intelligence/operations teaming, a

shared common operating picture and the effective employment of MI assets enable timely fusion of all information across a flat network.

Current and projected operational information will be continuously fused by robust knowledge management systems and disseminated to all levels of users through adaptable, flexible, networked, communications systems. Within this flat network, force elements will subscribe to products or data. Software agents will broker data and products, posting some unprocessed information. In this manner, all Joint, Allied and Coalition warfighters will have a synchronized common operating picture of the battlespace with access to common data, within security access and transport layer constraints and the ability to construct their own tailorable, relevant operational pictures resulting in enhanced BA.

Soldiers expect and deserve the best possible intelligence tools and BA capabilities the Nation can provide as they execute challenging missions in unforgiving, complex environments. The Army, as part of the Joint team, is taking aggressive action to meet these challenges in close coordination with Joint, Department of Defense and National Intelligence Community partners.

## Space Capabilities

Space is a significant area of Joint development that supports enhanced BA capabilities, and is the backbone for the National and military ISR architecture, as well as the domain of choice for commercial broad-area sensing enterprises with military utility. Space-based communications provide reach and NLOS connectivity, while space-based ISR and commercial imagery platforms substantially enhance strategic, operational and tactical intelligence collection, processing and dissemination. Space-based assets continuously monitor the globe for foreign

missile launches and can be leveraged to detect large infrared events on the ground in near-real time. Soldiers in OEF and OIF use space-based systems to communicate, navigate, target, find and fix the enemy, anticipate weather, receive missile warning, maintain situational awareness across extended areas of operations, avoid fratricide and much more.

Army Space Forces are deployed worldwide supporting U.S. efforts to fight and win the GWOT. Army Space Support Teams have provided space products and services to corps, Marine Expeditionary Forces and Joint Task Force headquarters throughout OIF/OEF. Space Support Elements, as part of modular division and corps staffs, have filled a critical space planning and coordination role. Army Space Forces continue to enhance the effective application of space-based assets and capabilities across the full spectrum of military operations in an interdependent, Joint and multinational environment.

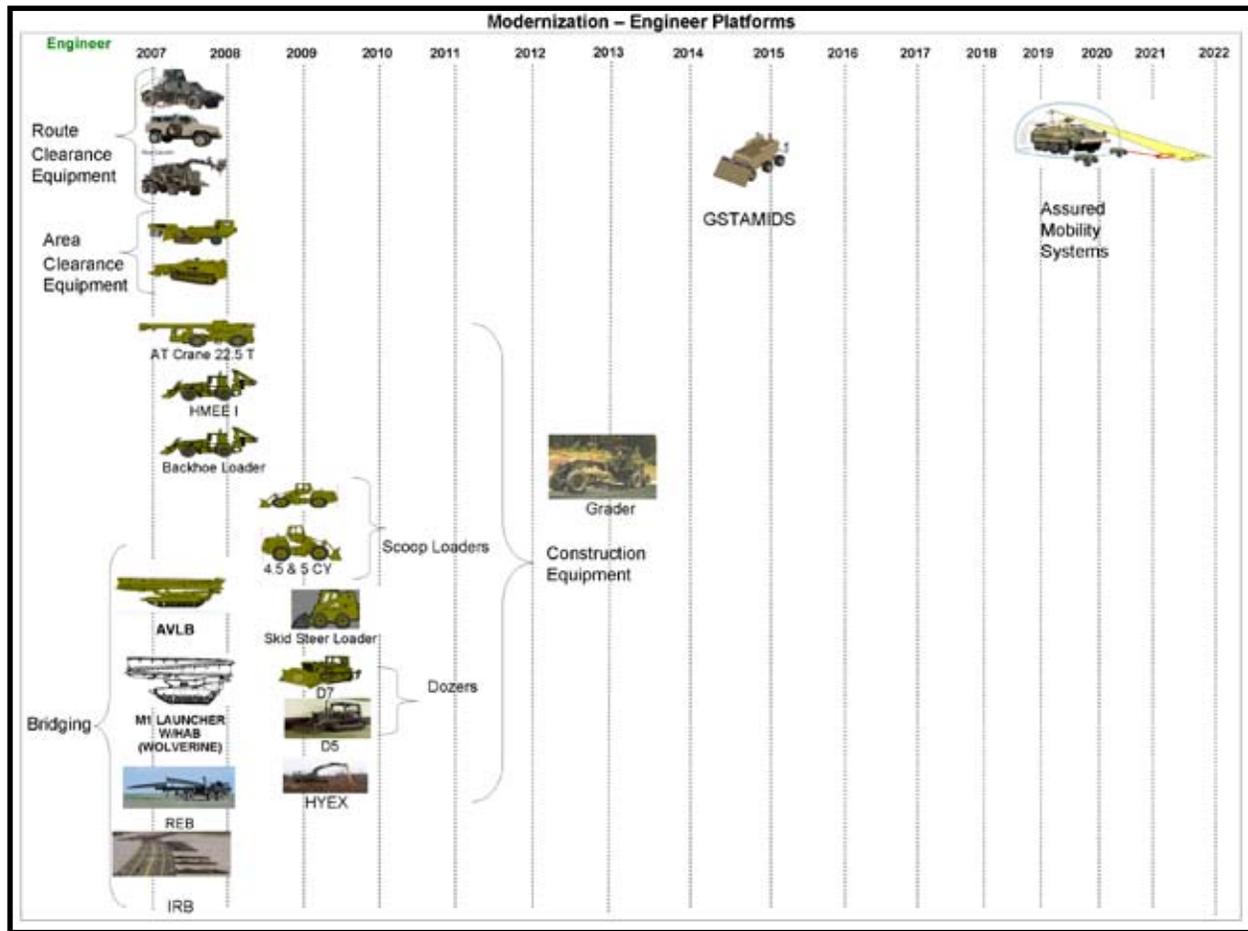
## Role of Space in the Army

Among the Army's formidable capabilities is its global space reach, with assets and operations around the world. Space support to Army operations is divided into four space mission areas: Space Force Enhancement,

Space Control, Space Force Application, and Space Support. Army Space Forces execute tasks within the Space Force Enhancement and Space Control mission areas. Space Force Enhancement functions improve the effectiveness of forces across the full-spectrum of operations by providing space-based operational assistance to ground maneuver force elements. These functions include long-haul and reach back satellite communications spanning multiple frequency domains, environmental monitoring of both terrestrial and space conditions that may impact operations, and space-based intelligence, surveillance and reconnaissance. Other Space Force enhancement functions provide precision position, velocity, navigation, and timing information that is crucial to modern combat operations, theater missile warning and near-real time battlefield characterization.

Space Control operations ensure freedom of action in space for the United States and its allies and, when necessary, deny an adversary freedom of action in space. Space control involves the interrelated objectives of space surveillance, protection, prevention and negation.

## Section 9: Engineer Equipment

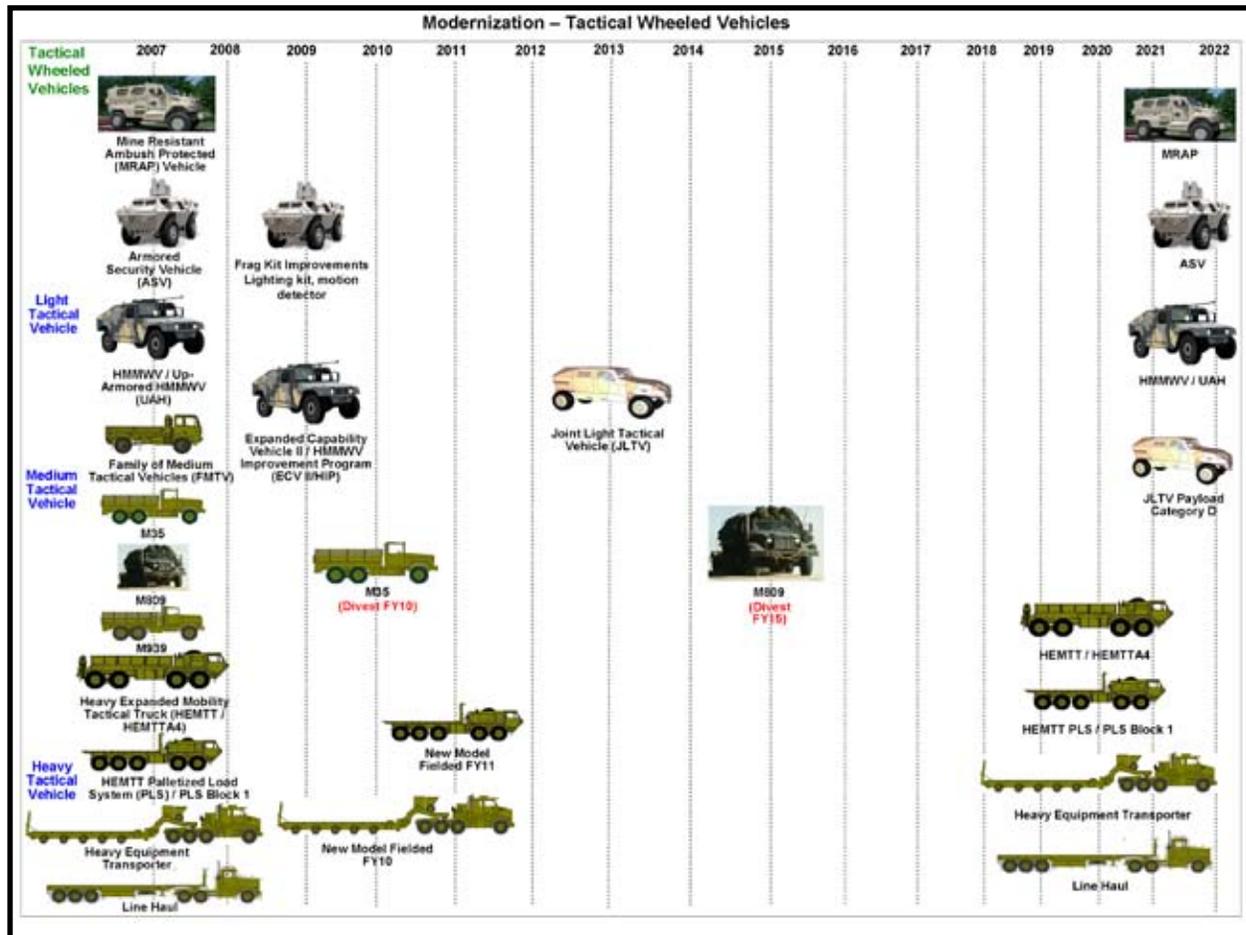


### Engineer Construction Modernization Overview

The *Army's Strategic Planning Guidance* calls for a more relevant and ready Engineer force with a Joint and expeditionary mindset. To accomplish this, the Army must retain the best of its current capabilities and attributes while developing others that increase relevance and readiness to respond in current and projected operational environments. A critical need exists for an excavation system that is capable of providing mobility, survivability and counter

mobility support across the entire spectrum of conflict. The Future Construction Engineer Forces structure will be modularized and consist of the families of vehicle such as Dozers, Loaders, Graders, Scrapers, HYEXs and a host of other equipment. A few of the supporting tasks will perform include: preparing and filling craters on airfields, filling in pot holes, clearing/repairing drainage, lifting debris, loading aggregate required for construction or repair, digging trenches for culverts and rapid repair of existing roads. Specific program details and status are in Annex A.

## Section 10: Tactical Wheeled Vehicles Modernization



### Tactical Wheeled Vehicle Modernization Overview

The Army's Tactical Wheel Vehicle Strategy will achieve the proper balance between a variety of competing factors: support of current operations and fleets, Army transformation, and building future fleet capabilities while optimizing strategies for procurement, recapitalization, and sustainment. The strategy seeks to ensure fleet viability and combat effectiveness for the next three decades. The strategy is being developed in cooperation with key stakeholders from the Headquarters, Department of the Army

staff and selected Major Army Commands—including G-3, G-4, G-8, ASA (ALT), PEO-CS & CSS, CASCOM, TRADOC, the Joint Staff and the USMC. The industrial base, Army depots and the commercial sector will also be considered in developing this strategy.

The TWV assessment conducted in fiscal year 2003 indicated the TWV fleet was aging at an accelerated pace because of the current operational environment and low funding levels. Current operations and The Global War on Terrorism have added significant wear and tear to the fleet and revealed

# MODERNIZATION STRATEGY

major shortcomings in the areas of force protection, mobility, transportability and maintainability. As such, specific recommendations and initiatives are being implemented to address these issues and serve as the foundation of the TWV strategy. A modernization plan is being developed for each category of the TWV fleet: light, medium and heavy wheeled vehicles and trailers.

Modernizing the Army's TWVs is a critical imperative that strives to provide the Soldier with the best protection, payload and performance in each vehicle in the fleet. Rapidly evolving threats and constant improvements in technology require a continuous modernization effort. The success of such an effort depends upon both the ongoing application of evolutionary improvements to current platforms and investment in revolutionary improvements for future platforms.

In the near term, the Army's main modernization focus for its TWVs is to apply the concept of scalable armor across the TWV fleet. This concept involves producing vehicles with armor "A kits / A cabs" and "B kits." The A kits / A cabs consist of armor that is integrated at the time of production at the factory to provide an inherent level of protection and has the ability to accept supplemental armor in the form of a modular B kit. Having scalable armor provides the Army with tactical flexibility to deal with contingencies where armor may, or may not be needed. It also supports continuous improvements in armor capability by allowing the latest armor technology to be applied to a vehicle in the form of a B kit, without replacing the entire vehicle. Fielding began by shipping over 600 armored medium and heavy tactical vehicle kits in support of the surge.

This scalable armor concept has been applied to Up-armor HMMWV production since late 2006 and the Army intends to apply it to Medium Tactical Vehicle

and Heavy Tactical Vehicle production in late 2008 and beyond. For the MTV fleet, the application of scalable armor involves slight modifications to the existing production of the Family of Medium Tactical Vehicles. Additionally, the FMTV is an ongoing modernization effort that is scheduled to result in the divestiture of all M35 trucks from the Army by the end of 2010 and all M800 series trucks by the end of fiscal year 2015.

In the case of the HTV fleet, the application of scalable armor will be executed in conjunction with the production of new HTV variants, such as the Heavy Expanded Mobility Tactical Truck A4 in 2008, the Palletized Load System Block 1 planned for 2009, and the M915A5 Line Haul also planned for 2009.

Light Tactical Vehicles represent 63% of the total fleet. This plan seeks to improve on the original High Mobility Multi-purpose Wheel Vehicle concept by developing a Joint Light Tactical Vehicle family with increased ballistic and blast protection with assigned category payload, agility, mobility, sustainability, and rotary wing transportability. The procurement of this future force JLTV family, coupled with modernization under the recapitalization programs, would increase the capability of the current LTV aging fleet.



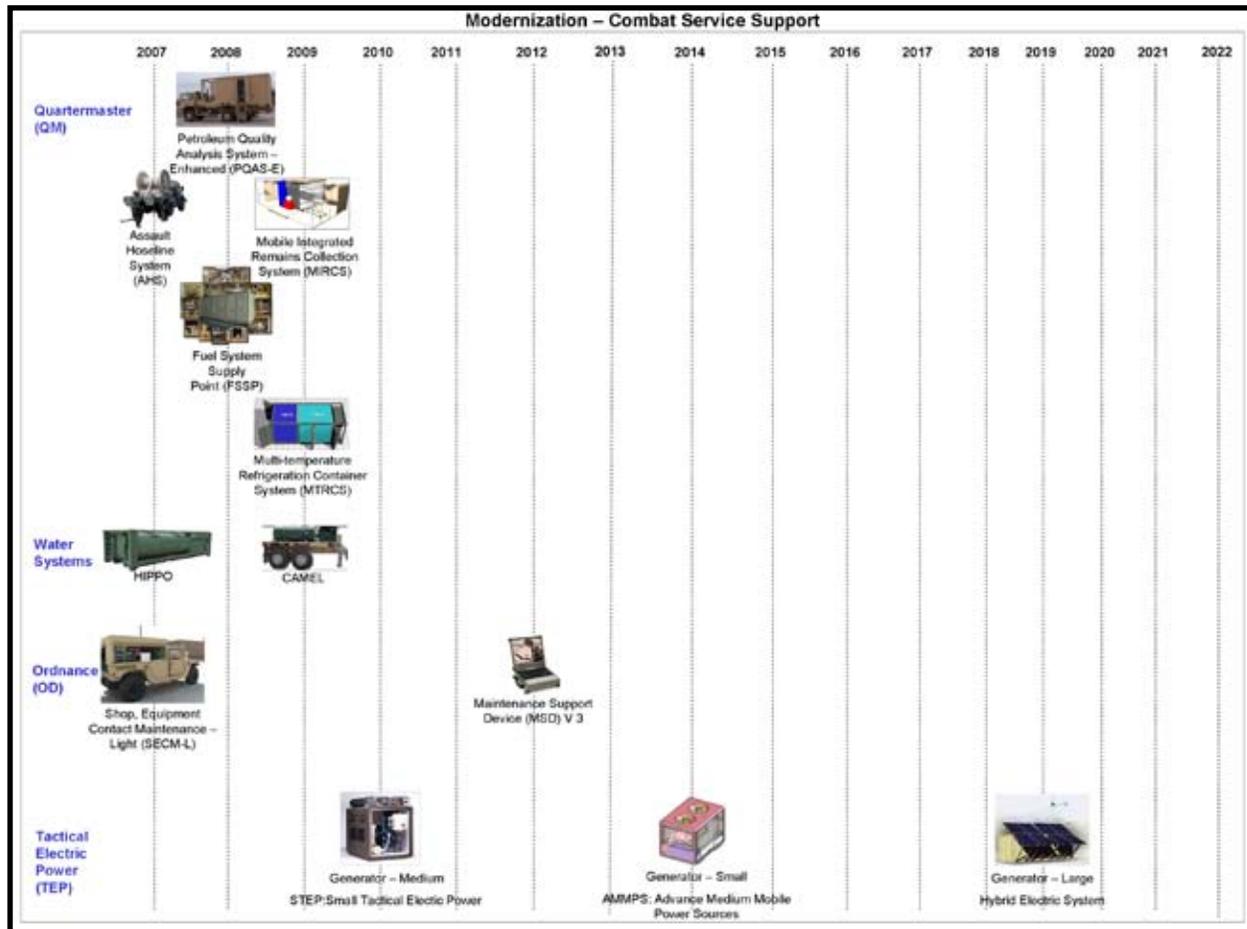
Taking this longer view into account, the Army continues to develop and assess the JLTV as a possible replacement for an undetermined number of HMMWVs. As currently planned, the JLTV has the potential to provide significant and revolutionary increases in protection, performance and payload capabilities beyond those available in the current HMMWV or up armored HMMWV (UAH). However, the ability of the JLTV to achieve these capabilities depends in large measure on the maturity of technology and the availability of resources in the coming years.

In the interim, the Army will continue to assess the potential of the HMMWV Improvement Program designed to use existing technology to improve the UAH's force protection, performance, and payload

capabilities. Additionally, the Army is also considering procurement of a next-generation HMMWV as a possible bridge to the JLTV. The decision to procure an interim HMMWV will be based in part on how well the development of the JLTV progresses in the coming years.

The Army envisions this strategy to be a living document and will conduct annual assessments of the TWV fleet at strategic decision points. It will track the progress of this strategy, identify shortcomings and make necessary adjustments during the subsequent Program Objective Memorandum builds. The continuing use of advanced technologies will ensure enhanced capabilities are provided to support our Soldiers and overall Army requirements. Specific program details and status are in Annex A.

## Section 11: Combat Service Support



### Combat Service Support Modernization Overview

Modernizing the Army's Combat Service Support (CSS) equipment is a critical enterprise that provides the Soldier with the latest in capabilities required to sustain and maintain current and future weapon systems. Rapidly evolving threats and developing technologies require continuous employment of evolutionary improvements to most current platforms in the near term and investment in revolutionary improvements to others for the long term.

The development of CSS equipment is imperative to the success of the war fighter. In many cases visibility is lost as to the ramifications of non-modernized CSS equipment and its impact on the fighting force. The ever progressing technology involved in creating more deadly and effective combat platforms is the same technology-base required in the support functions. For example; common progression of Windows based software has dramatic impacts on support equipment to maintain complex weapons hardware.

Several programs are involved in this technology driven evolution of CSS Equipment. Logistics

Automation modernization includes the advancement of the current standard tactical army management information systems Standard Tactical Army Management Information System programs with the adoption of Global Combat Service Support System – Army program in fiscal year 2011. This program will consolidate several independent functions into one platform. The spiral development of the Next Generation Automatic Test System is also intended to incorporate advanced technology to keep pace with the steadily increasing progression of weapons technology. With a planned first unit equipped date of fiscal year 2010, this program through the installments of three increments, is designed to consolidate three independent testing platforms into one by the end of fiscal year 2010.

Maintenance diagnostics is supported through the continual life-cycle-replacement and modernization of the Maintenance Support Device (MSD). Originally designed and procured to replace the aging Soldier Portable on System Repair Tool system, MSD has grown from a diagnostic tool for wheeled and tracked vehicles to a platform heavily relied upon by mechanics and also Explosive Ordnance Disposal technicians as data base for technical manuals. This drastically increases maintenance efficiency. Future versions of the MSD as seen in the “Version 3” with a projected field date of fiscal year 2010 will maintain technology compatibility with past, present and future weapons platforms through the extended planning period.

Power generation is supported through the procurement and advancement of Tactical Electrical Power. A bulk percentage of the current inventory for Power Generation is the Military Standards

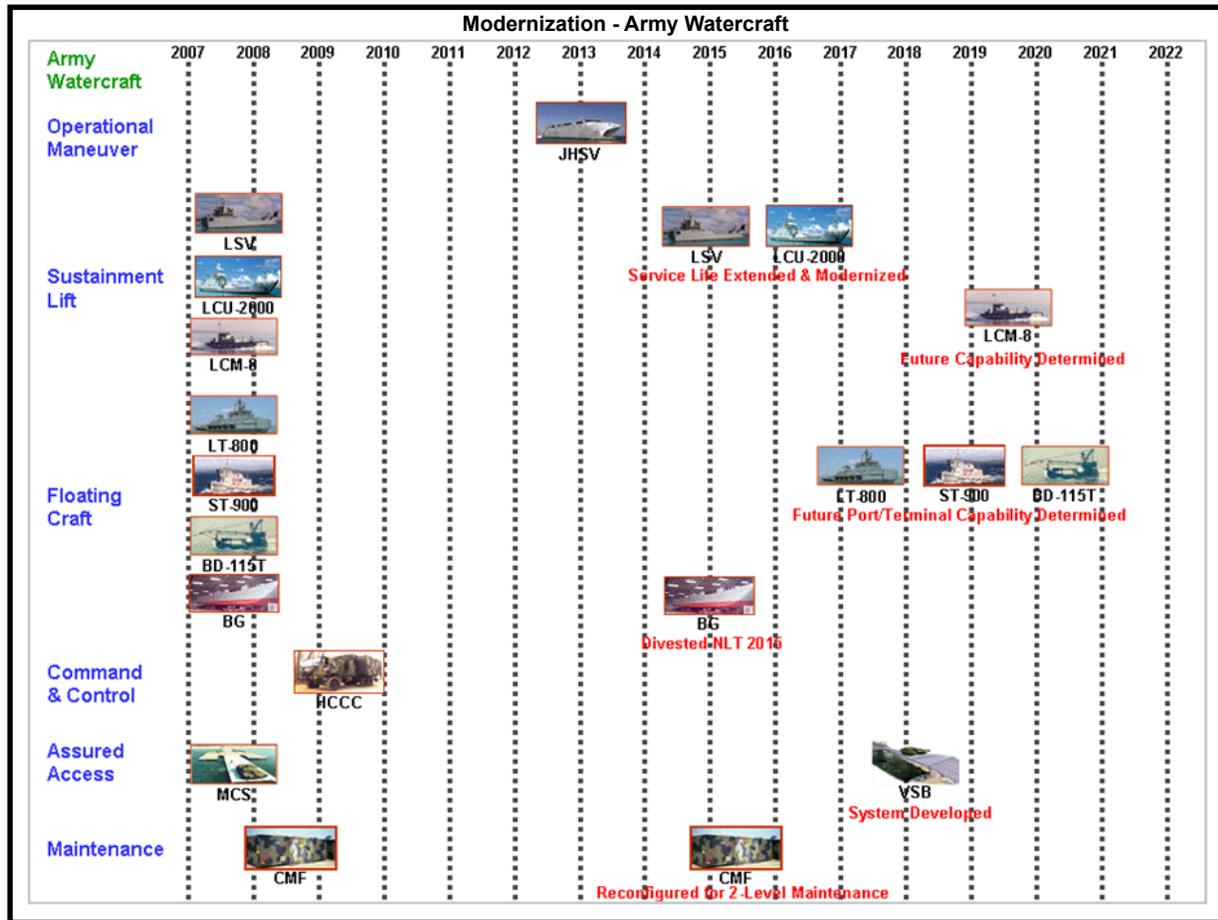
that do not meet current doctrine requirements in supporting today’s Soldier. Introduction of the new Small Tactical Electrical Power in fiscal year 2014 will dramatically reduce fuel consumption and extend usage timelines. Advanced Medium Mobile Sources will begin a progressive replacement of current Medium Generator sets starting in 2010. Advancements are being made to modernize to a Hybrid Electric System which will dramatically reduce the Army’s power reliance on petroleum based fuels.

Combat Service Support Equipment modernization also includes the evolution of the Petroleum Quality Analysis System. The next generation of this program is referred to as the PQAS-Enhanced which provides the ability to carry Armor kits and conduct higher levels of Petroleum, Oil & Lubricant testing never before available in the field.

The first major revolution in basic water distribution is taking place with the induction of the Camel which replaces the water trailer. This new Camel brings greater water capacity, the ability to heat and cool its contents, and has more than doubled the available water distribution points on the tank.

Implementation of modularity and transformation has created the absolute need for a smaller logistical footprint and modernization to support the force. This openly implies the need for consolidated support platforms with consolidated capabilities. As the current operational environment continues to evolve, so must the inventory of Combat Service Support equipment that supports it. Specific program details and status are in Annex A.

## Section 12: Army Watercraft



### Army Watercraft Modernization Overview

The Army Watercraft Fleet has undergone significant change since the Army initiated the *Army Watercraft Restructuring Plan* in 2002. This plan directed the following:

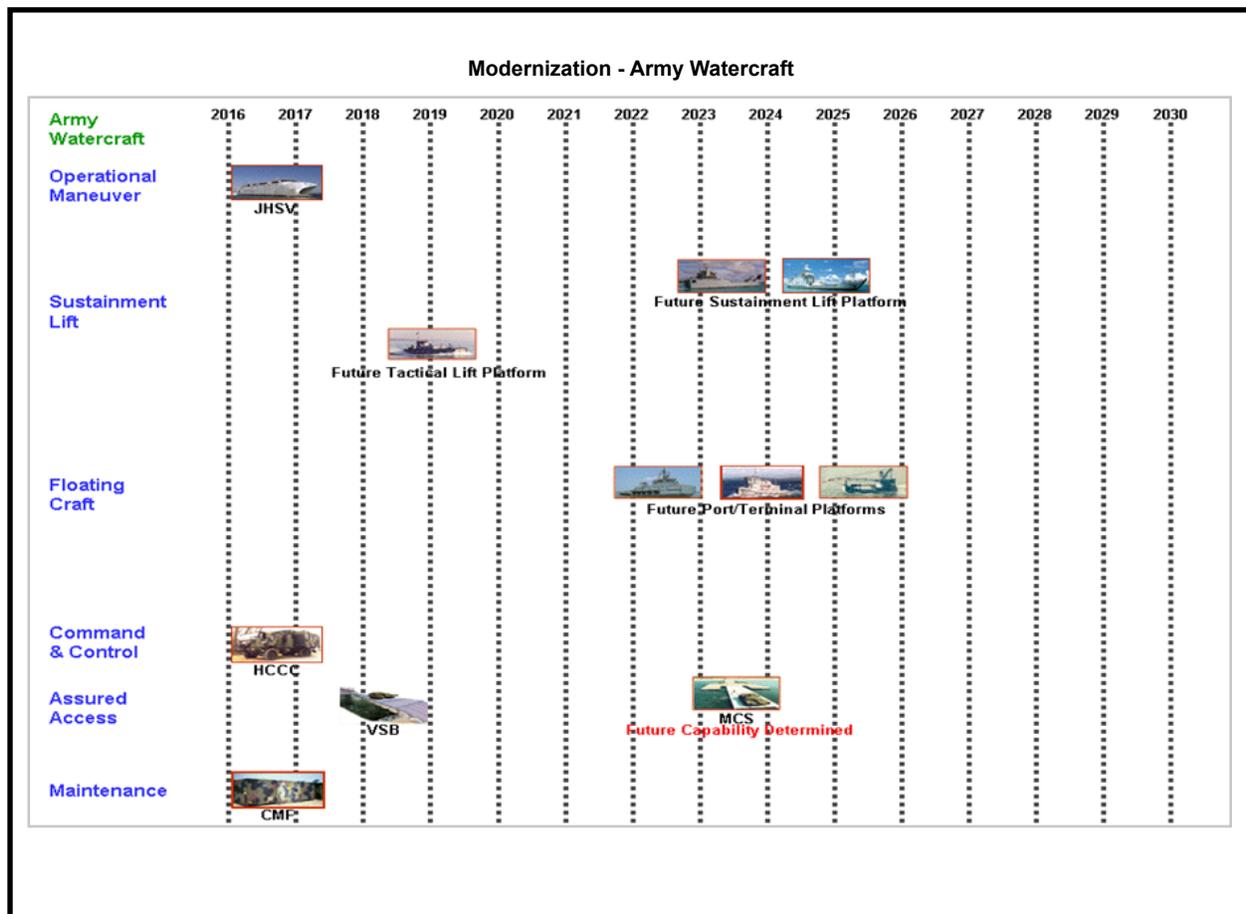
- Divestiture of 135 vessels
- Reallocation of 355 Active Component and 264 Reserve Component spaces
- Implementation of forward-stationing and pre-positioning strategies resulting in cost

avoidance of approximately \$40M per year through elimination of APS 3 sustainment and deployment costs

- Recognized emergence of a new capability defined by the Joint High Speed Vessel program

*The 2008 Fleet Modernization Strategy* builds on earlier work by charting a course for continued modernization of Army watercraft capabilities in the context of future Joint operational requirements. This strategy seeks the balance between fighting a continuing global war while also transitioning to the Army's Future Modular Force, and is built on input from a wide range of

## Section 12: Army Watercraft (Continued)



stakeholders from across the Army and DoD. The U.S. Army Combined Arms Support Command recently completed a Capabilities-Based Assessment of Army Watercraft. Approved by the Army Capabilities Integration Center on 13 November 2007, this Joint CBA has been translated into a modernization strategy detailed in the 2008 *Army Watercraft Master Plan (Fleet Strategy)*.

The 2008 *Army Watercraft Fleet Strategy* sets the priorities and describes the actions to take to ensure the fleet possesses capabilities dictated by the Army's Future Modular Force. This modernization strategy

focuses on the actions that must take place in the 2008-2014 timeframe to achieve and maintain the minimum operational capabilities needed through 2024: Field Joint High Speed Vessel, Harbormaster Command and Control Center and Vessel-to-Shore Bridging. The JHSV and the HCC are critical capabilities already under development that fill critical gaps in closing, maneuvering, providing battle space awareness for, and interoperability with Joint and Modular Forces. Further, Vessel-to-Shore Bridging capabilities are a key enabler for the JHSV and current fleet vessels in meeting speed and assured access requirements.

# MODERNIZATION STRATEGY

The Future Force needs an Army Watercraft Fleet that possesses a range of lift capabilities. The JHSV helps close new capability gaps in operational and tactical maneuver, but the Army will continue to require the heavy sustainment lift provided by the LSV and LCU-2000 fleets. Our strategy will be to maintain our existing LSVs and LCUs, and focus our resources on making the upgrades needed to those vessels' C4ISR and force protection capabilities.

LCM-8 watercraft are rapidly nearing a "drop-dead" date beyond which they are not viable due to maintainability costs. The Army places a priority on determining the Future Force requirements for continuing this capability.

Our Joint analysis and fleet assessment indicates the need to integrate Army Watercraft Fleet modernization with emerging terminal operations

concepts. Our current floating craft fleet can meet the capabilities the Army requires in the 2015-2024 timeframe.

The CBA identifies the need to develop future sustainment lift capabilities however, we can meet Future Force sustainment lift requirements by extending the service life and applying appropriate upgrades to the LSV and LCU fleets. The Army is also beginning to explore future platform requirements while executing planned upgrades to the current fleet. We will continue to actively engage and participate in capability development programs in partnership with other Services and COCOMs that will impact Army Watercraft fleet modernization and potentially lead to future materiel and non-materiel development. Specific program details and status are in Annex A.

## Chapter 4—Incorporate New Technologies Derived From Future Combat Systems (FCS) Research and Development (R&D)

### Introduction

The Army recognizes the need to accelerate emerging technologies to improve the capabilities of Soldiers fighting in combat today. Incorporating new technologies derived from Army Science and Technology (S&T) and FCS R&D allows the Army to exploit and leverage R&D efforts sooner with mutually supporting technology enhancements across the force. Through a process known as Spin-outs, the Army is leveraging Army S&T and FCS R&D efforts to insert promising new capabilities into the Current Force. FCS core and complementary systems that address current capability gaps are integrated into current formations, or “Spun-out,” as they mature.

Over the last several years, the Army demonstrated its adaptability by pushing future capabilities to the Current Force while deployed. Precursors of the Future Combat Systems program are in combat today in Afghanistan and Iraq. For example, 18 Micro Aerial Vehicles (MAVs) are currently deployed with Navy Explosive Ordnance Disposal units. These FCS Class I UAV precursors are used to locate IEDs and have proven critical to mission accomplishment. A Brigade Combat Team will deploy 36 MAVs to Iraq in mid 2008. Additionally, there are approximately 4,000 robots in theater today. Many of these systems are precursors like the FCS Small Unmanned Ground Vehicle that performs vital IED defeat missions that may otherwise be conducted by Soldiers. Finally, as a result of the Army Science and Technology and FCS efforts, improved fragmentary protection kits for HMMWVs and MRAPs were provided to respond rapidly to an evolving threat.

### Setting the Conditions for Spin-outs

The Army must methodically set the conditions to execute the Spin-out plan while maintaining the flexibility to respond to urgent needs. FCS Spin-outs are based on requirements that are defined in accordance with the Joint Capabilities Integration and Development System. FCS Spin-outs are programmed in the Army’s base budget request. The fielding plan adheres to Joint acquisition and force management, doctrine, requirements and metrics. Accordingly, technologies will be demonstrated and deemed mature before the Army commences Low Rate Initial Production of FCS Spin-out systems. The Army has established a program manager responsible for FCS Spin-out integration, as well as TRADOC’s Future Force Integration Division (FFID) at Fort Bliss, TX to synchronize Spin-out development.

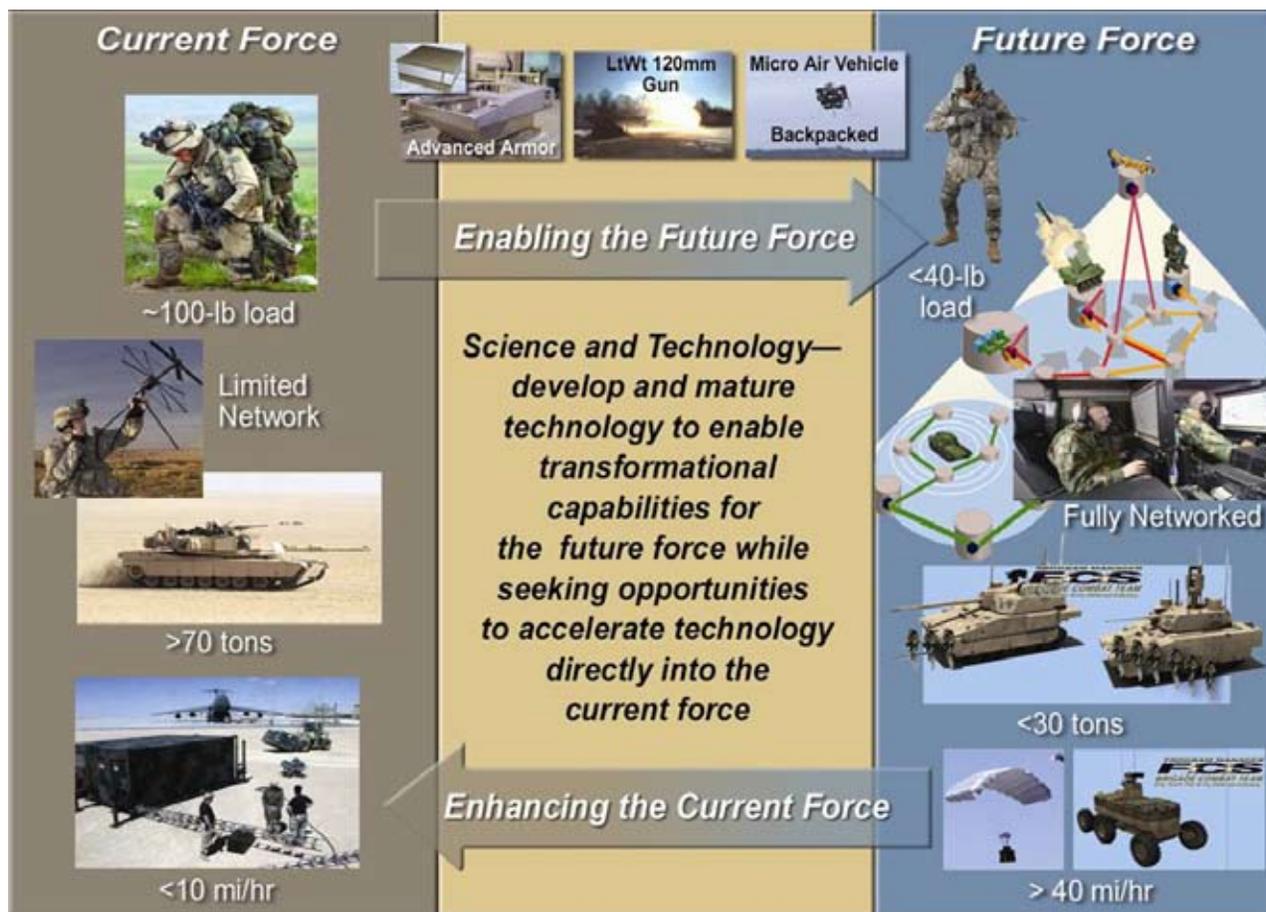
Setting the conditions for Spin-outs requires two essential efforts. First, the Army must address the capability gaps of Current Force vehicles that must host FCS Spin-out technologies. The Army’s Spin-out efforts to date demonstrate that Current Force vehicles cannot support the power loads and the internal space required to deliver full FCS capabilities. The Army must aggressively address the challenges and limitations of its current fleets in order to deliver the capability improvements envisioned for Spin-outs. Secondly, the Army must leverage the full capacity of the Army Science and Technology community. This will afford the Army the flexibility to address the Army’s needs comprehensively by deriving solutions to diverse problems from the FCS program and beyond.

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## Overcoming the Limitations of Current Platforms

The Army's Spin-out plan recognizes upgrading current systems are a critical component to delivering FCS Spin-out capabilities to the Current Force. Today's Soldiers desperately need the ability to send and receive digitized data in volume while on the move. Capabilities that were once exclusive to static headquarters must be resident in the platforms that deliver Soldiers into combat. Delivering less deprives the Soldier and his leader the situational awareness that is required in a dynamic combat environment. Current Force vehicles lack the power and space available to host many needed technologies without significant upgrades.

Spin-outs must be fully interoperable with upgrades to current platforms to ensure seamless execution of our Spin-out plan. FCS Spin-out components must compete with other valid claims against the space, and power of our current platforms. Lessons learned in combat are manifested in incremental capability upgrades to our combat platforms. In many cases these new capabilities are derived from new components that add weight and power requirements to our already stressed fleets. The Army recognizes that its modernization strategy is mutually supportive. In this case, the efforts discussed in the previous chapter to upgrade current platforms lay the foundation for incorporating new technologies derived from FCS research and development.



## Leveraging Science and Technology— Enhance the Current Force, Enable the Future Force

The Army is developing technology through investments in the three components of Science & Technology (S&T):

- In the near-term, demonstrating mature technology in relevant operational environments to speed technology transition into acquisition programs
- For the mid-term, translating applied research into militarily useful technology applications
- For the far-term, conducting basic research to create new understanding for technologies that offer paradigm-shifting capabilities

Army S&T Strategy is to pursue technologies that will enable the Future Force while simultaneously seeking opportunities to enhance the Current Force. These forces require technology solutions from networked capabilities and increased responsiveness through speed and precision lethality. From a strategic perspective, the S&T community supports the GWOT in three ways. First, Soldiers benefit today from technologies that emerged from our past investments. Second, we exploit transition opportunities by accelerating mature technologies from on-going S&T efforts. Third, we leverage the expertise of our scientists and engineers to develop solutions to unforeseen problems encountered during current operations.

The Army's largest S&T investments are for force protection technologies to detect and neutralize Improvised Explosive Devices, mines, rockets, artillery and mortars; to improve Soldier and vehicle survivability and to enhance area/facilities protection.

The Army's S&T invests in a diverse portfolio of technologies and research to provide solutions across a spectrum of enduring capability needs. This portfolio includes C4ISR, lethality, Soldier Systems, unmanned systems, logistics, advanced simulation, medical and manufacturing technologies and basic research.

**C4ISR.** We are developing and demonstrating technologies to speed the ability to collect and disseminate information from sensors through Battle Command software and hardware for current and future C4ISR capabilities.

- Sensor development seeking to provide Soldiers with the means to detect individuals, platforms, and other threats at greater stand-off distances and with more fidelity
- Through-the-wall sensors
- Sensors for detecting, tracking and "tagging" individuals
- Data fusion technology to provide commanders and Soldiers with timely and relevant situational awareness
- Networked sensors
- High bandwidth directional antennas, networking software, decision tools and information security algorithms

**Lethality.** These technology investments provide Soldiers and platforms with overmatch against threat capabilities. Lethality technologies include:

- Electromagnetic (EM) Gun. The Army is pursuing EM Gun technology for conventional direct and indirect fire cannon (gun) propulsion. This technology uses large electrical currents to accelerate a projectile rather than using conventional propellants. EM Gun has the potential to reduce and simplify the logistics burden through decreased size and weight of

# MODERNIZATION STRATEGY

these projectiles compared to conventional gun projectiles

- Directed Energy (DE) weapons. DE technology investments focus on demonstrating solid state high energy laser and high power microwave weapons. These DE weapons offer the potential to defeat rockets, artillery and mortar munitions while providing precision area protection—reducing collateral damage
- Scaleable lethality warheads. Future multipurpose warhead technologies for missiles and gun launched munitions seek to provide tailorable lethality effects

- Novel energetics for increased lethality
- Advanced precision guidance, control and munition seeker components

**Soldier Systems.** S&T investments seek to enable TRADOC's Soldier as a System concept that envisions equipping Soldiers with an integrated modular ensemble (using an open architecture), providing mission tailorable capabilities. Technologies to provide individual Soldiers with platform-like lethality and survivability include:

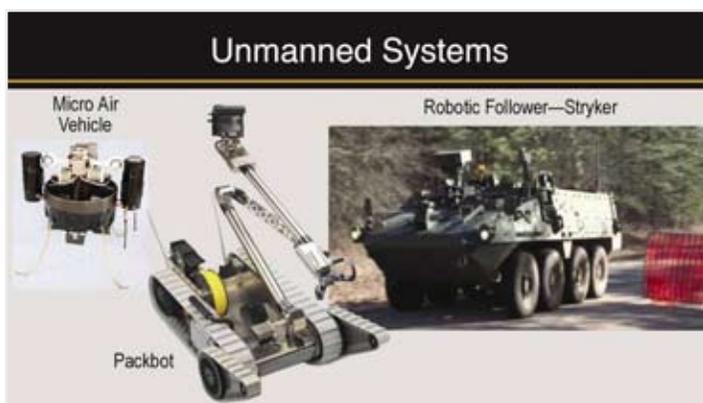
- Ultra-lightweight materials and nanotechnology to enhance Soldier protection from bullets,



**Soldier Systems**

fragmentation, blast and other lethal mechanisms

- Lightweight, long-endurance electric power generation and storage
- Physiological status and diagnostics as well as reporting and “on the uniform” medical response interventions
- Embedded and immersive training and mission rehearsal environments, as well as cultural awareness and translation tools



This graphic depicts clockwise from top left 1) Micro Air Vehicle, 2) Robotic Follower—Stryker, 3) Packbot

**Unmanned Systems.** The goal of unmanned S&T investments is to provide Soldiers with new capabilities that can unburden them from dangerous, routine and long duration missions that do not require the full dimension of human capabilities. Technologies are being developed for unmanned aerial and ground vehicles, unattended sensors and “intelligent” (automated functioning) munitions. Unmanned systems have already demonstrated their ability to enhance Soldier capabilities in a variety of applications to support the Global War on Terror. The S&T emphasis is pursuing more autonomy in unmanned systems through work to improve perception, mobility and “intelligent” vehicle control

with less human supervision. Unmanned systems technologies include:

- Algorithms for real-time object and terrain detection, classification and identification
- Algorithms for increased tactical behavior enabling unmanned systems to act more independently during tactical maneuvers
- Passive and active sensor technology along with multispectral and robotic sensor fusion for higher performance systems (speed, autonomous vehicle situational awareness)
- Intelligent agents, adaptive automation, augmented and interactive displays to enable human-unmanned and unmanned-system capabilities

**Logistics.** Technology investments are focused on increased reliability, durability, and reduced maintenance for all systems and components. Embedded prognostics and diagnostics are being developed for dynamic monitoring of critical vehicle component and system “health” and reporting equipment status before a failure occurs. While pursuing operational and support cost reduction and increased performance, the technology program is also seeking to reduce fuel consumption. Up to 15 tons precision air-drop delivery technology is being developed that is enabled by GPS guidance, ram-air parachutes and impact absorption landing technologies to provide essential logistics. Logistics technologies include:

- Water recovery and purification systems
- Petroleum fuel reformation technologies
- Prognostics and diagnostics modeling, sensors and signal processing
- High efficiency vehicle power and drive drains

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for reduced fuel consumption and increased performance

- Technologies for reduced operations and sustainment demands for rotorcraft
- Energy and Power:
  - Electric and hybrid electric vehicle technologies have the potential to achieve significant reductions in fossil fuel requirements and the associated logistics burdens.
  - Advanced batteries, capacitors, switches, generators, auxiliary power units, fuel cells; and other devices will improve electric power generation, storage and conditioning efficiency to reduce Soldiers' loads and equipment weight.
  - Compact pulse power systems will also enable new capabilities such as electromagnetic armor or directed energy weapons.

**Advanced Simulation.** Advanced simulation technology investments seek to provide robust, networked, live, virtual and constructive simulation environments that have the potential to enable revolutionary training, mission rehearsal, leader development and simulation tools for designing and evaluating new technologies. Investments in simulation technology also provide the tools, techniques, and analyses capabilities to enable collaborative, distributed and Joint operational simulations.

**Medical Technology.** Medical technology investments to improve protection (inclusive of blasts from explosive devices), treatment and life-saving interventions for Soldiers. This program has three components: infectious disease (diagnosis, treatment and preventatives), combat casualty care and military operational medicine under environmentally extreme conditions world-wide.



**Fluid Resuscitation Technology - Fluid Resuscitation Technology consists of blood components, fluids, and drugs for the control of bleeding on the battlefield.**

**Manufacturing Technology.** This program focuses on improving new technology producibility and affordability by developing reliable manufacturing processes and increasing production yields. This technology seeks cost savings and risk reduction in military-unique manufacturing processes to achieve economic production rates. This program also fosters the transfer of new/improved manufacturing technologies to the industrial base.

**Basic Research.** Basic research seeks to provide new understanding in nanomaterials for ballistic protection, biotechnology for improved materials for network sensors, network science to enable next generation, network-centric technologies and immersive simulations for training and mission rehearsal.

The Army's S&T efforts are consistent with the capabilities the FCS program is developing. By focusing on our broader S&T efforts the Army gains valuable flexibility filling the urgent needs of Soldiers in combat today. The formal Spin-out plan is currently comprised of FCS core and complimentary systems. In these uncertain times the Army is poised to draw from

the great reservoir of talent and skill within its S&T community to respond to urgent needs through FCS Spin-outs. This maximizes our opportunities to exploit and leverage R & D efforts sooner.

## The Army Evaluation Task Force (AETF): Evaluating FCS Technology in the Hands of Soldiers

The Army has established the Army Evaluation Task Force at Fort Bliss, Texas, to evaluate and validate new technologies developed through the FCS Program. Designated as the 5th Brigade, 1st Armored Division (AETF), this unique Army organization supports the evaluation and testing of the FCS Brigade Combat Team designs, operational concepts, war-fighting capabilities and training.

With the AETF providing input, the Army Test and Evaluation Command (ATEC) assesses the performance of FCS Spin-outs technologies as well as the FCS core programs. The net impact of 5th Brigade, 1st Armored Division (AETF) is to put Soldiers into the design cycle and streamline FCS development for the Army. Soldiers of the AETF, with their relevant combat expertise (over 80% of the leadership are combat veterans), unleash the power of the Future Combat Systems in the desert of Texas and New Mexico, rather than the unforgiving sands of Iraq and Afghanistan.

The AETF was established to provide a dedicated unit and Soldiers to provide feedback for system development and fielding decisions for FCS systems. The unit is manned and equipped, based on tester, materiel developer and the Training & Doctrine Command and Forces Command review to ensure a complete evaluation of FCS systems. As decisions are made on future Spin-outs, the design and organization of the AETF will be reviewed to ensure it is organized to best support its ongoing mission.

The Future Force Integration Directorate (FFID) is also located at Ft. Bliss. It provides an integrated staff of materiel developers, modeling and simulation personnel, and capabilities managers and developers to oversee the AETF and provide integrated support and oversight to the FCS program testing and evaluation. This organization, a directorate of the Army Capabilities Integration Center (ARCIC) of TRADOC, is key in the identification, design, development and synchronization of capabilities into the Army current Modular Force and the validation of the Spin-out process, ensuring FCS Spin-outs are integrated throughout the domains of Doctrine, Organization, Training, Materiel, Leader Development, Personnel and Facilities.





Figure C-1 Capability You Get

## Delivering Spin-outs to Infantry Brigade Combat Teams

The Army recently decided to focus FCS Spin-outs initially on Infantry Brigade Combat Teams (IBCTs). This decision is based on lessons learned from combat. Operational Needs Statements (ONS) from IBCT commanders were almost double the number from Heavy Brigade Combat Team (HBCT) commanders for 2007 and 2008. Additionally, IBCTs have capability gaps not found in our heavy force. Our Infantry Brigade Combat Teams (IBCTs) have

been the highest demand in combat operations over the last five years. The Army is growing to meet global requirements and will add six IBCTs to meet the demands of today and tomorrow. The Army has the opportunity to make this adjustment because of the progress of FCS technological development

The Army's FCS re-sequencing efforts, from the HBCTs to IBCTs, will align the program with current demands, our new doctrine and shifts of funds to refocus on enhancing the IBCTs first. The Army is deploying

enhanced capabilities to the IBCTs first to increase their effectiveness and survivability across the spectrum for today and tomorrow's fight. Greater Soldier and unit effectiveness is essential to readiness.

Starting in July 2008, the FCS equipment will undergo a Preliminary – Limited User Test (P-LUT). The P-LUT is intended to refocus the previously scheduled Heavy BCT Limited User Test. The results from this testing effort will support doctrine, organization, training and materiel development efforts. The formal LUT scheduled in FY09 will become the basis of the Spin-out 1 acquisition decision. These changes will ensure that all 43 IBCTs are fully equipped with Spin-outs technologies by 2025.

The capabilities being brought to the Current Force from the FCS are ensuring the continued advantages of today's Soldier. The accelerated fielding of FCS technology is already evident in the precursor Class I UAV fielding to current brigades in the fight. The potential for today's units to simultaneously provide real time visual awareness of friendly and enemy



forces at the company and platoon level will greatly enhance small unit operations. The unveiling of the FCS Non Line of Sight (NLOS) Cannon technology is a milestone in the integrated network system. The combination of the Ground Soldier System, Tactical / Urban Sensors, NLOS Launch System, and integrated network communications on the HMMWV platform will give the IBCT unprecedented ability to see, know, understand, and act first down to platoon level.

## Chapter 5—Field Future Combat Systems

### Introduction

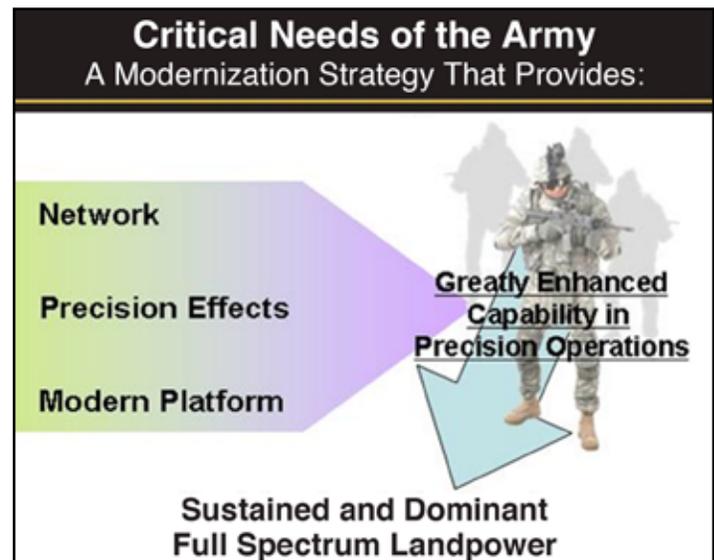
The Army is transforming into a networked Modular Force that is agile, globally responsive and sustainable. FCS is the core of this effort. FCS is designed to provide the Soldiers and leaders who engage the enemy with the situational awareness required for a decisive advantage in combat. Networked Battle Command and sensors will enhance the ability of platoons and companies to see the enemy and engage with precision. This is accomplished by providing Soldiers with Battle Command and sensor capabilities similar to those currently resident in brigade and division headquarters. The FCS BCT will be an integrated combat formation employing a system of systems approach to deliver the capabilities the Army needs. Fielding FCS will be fulfilling the Army's vision for the future by integrating full spectrum capabilities in its systems.

FCS is the fastest and surest way to transform the Army because it drives R&D, rapid fielding and modernization programs. The FCS BCT will be the Army's future tactical warfighting echelon -- a dominant ground combat force that complements the Joint team. Although optimized for offensive operations, the FCS BCT will be capable of executing full spectrum operations. The FCS BCT will improve the strategic deployability and operational maneuver capability of ground combat formations without sacrificing lethality or survivability. FCS is designed to provide Soldiers with the necessary situational awareness and force protection to defeat

adaptive adversaries. FCS embeds an advanced digital network in a family of highly survivable Manned Ground Vehicles. FCS breaks the mold of incremental, evolutionary improvements in favor of revolutionary change.

FCS responds to the critical needs of the Army. Operational Needs Statements confirm that commanders in Iraq and Afghanistan require:

- Increased Lethality
- Improved Survivability
- Increased Intelligence Surveillance and Reconnaissance
- Networked Battle Command
- Enhanced Logistics



**Figure 5-1 – Enhanced Capabilities of the soldier by providing an advanced network, and associated precision effects, integrated into a common platform. The result is dominant land power across the full spectrum of operations.**

The FCS BCT addresses these gaps through three complimentary efforts. These include developing an advanced digital network, enabling precision effects and building a modern platform that meets the needs of 21st Century.

## The Network

Information precision is the key for future landpower. The FCS network affords the FCS BCT the situational awareness and understanding necessary to effectively focus precision effects. Current Force units are severely hindered by the lack of real time situational awareness, and Battle Command on the Move. FCS provides redundant, scalable and tailorable networks on the move. The capabilities currently resident in division and brigade headquarters will be distributed to platoons and companies, allowing for unprecedented situational awareness for the Soldiers and leaders who make contact with the enemy.

## Delivering Precision Effects

The FCS network is the means the Army will leverage to provide precision effects to units in combat. Networked sensors and unmanned vehicles allow companies and platoons to develop the situation with far greater precision before making contact with the enemy. Precision in situational awareness and access to information leads to true precision fires for organic and Joint assets as well as improved force protection. These capabilities are essential in irregular warfare typically fought among the population. Enhanced vehicle prognostics, fault reporting and greater asset visibility enable precision logistics. Greater precision in logistics, coupled with other FCS efficiencies, reduces the numbers of convoys—one of greatest vulnerabilities in current logistics operations.

## The Modern Platform for the 21st Century

The Manned Ground Vehicle is the ground combat

platform that will deliver the FCS network and associated precision effects to Soldiers in combat. By incorporating the network into the original design, the MGCV will deliver capabilities far beyond the limits of current platforms. Today's vehicles lack the power and space to integrate full FCS technologies. The MGCV is designed for the power loads envisioned in the 21st Century. The MGCV is the key to a more agile force, by employing a common chassis that is lighter and less logistically dependent. Manned Ground Vehicles create efficiencies that allow double the number of infantrymen in squads (compared to an HBCT)—a key force multiplier in counterinsurgency operations. MGCVs offer several advantages to include:

- Advanced power generation and management—essential for network integration
- Embedded network capability to enhance situational awareness, which improves survivability and effectiveness
- Replaceable armor that can be upgraded to meet developing threats as technology advances
- Significantly improved reliability and maintainability as compared to Current Force; 80% of field level maintenance can be done by the crew, reducing requirements for mechanics
- Beyond Line of Sight and Non-Line of Sight precision fires at platoon and company level
- Advances in hybrid power propulsion mean fewer gallons of fuel and petroleum required to sustain operations
- Networked Battle Command
- Enhanced logistics

## Improving Force Protection

FCS Manned Ground Vehicles afford some of the most advanced ballistic technologies available. However, we will never be able to provide enough armor against an adaptive foe. Events in Iraq and Afghanistan have

# MODERNIZATION STRATEGY

shown that ballistic upgrades are quickly overwhelmed by enemy counteractions. Instead, we must protect Soldiers with a comprehensive approach built on improved situational awareness, enemy detection, threat disruption, and hit avoidance, as well as improved armor.

## Future Combat Systems provides a holistic approach to survivability including:

- Signature management and low probability intercept to deny the enemy the ability to detect FCS systems electronically
- Improved situational awareness and threat detection
- Improved protection against Improvised Explosive Devices, Rocket Propelled Grenades, and Anti-tank missiles
- Improved ballistic protection (360°) comprised of upgradeable Active Protection System (APS)
- Improved defense against Chemical, Biological, Radiological, and Nuclear (CBRN) effects, and toxic industrial materials and contaminants

## Enhanced Capabilities to Soldiers; Dominant Landpower to the Nation

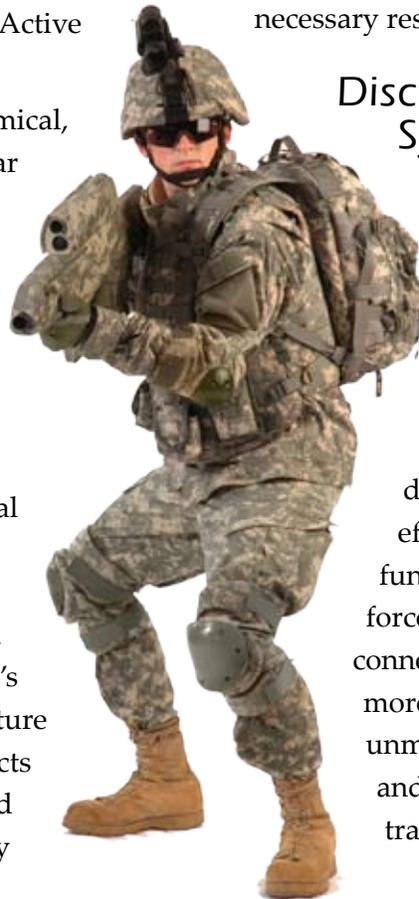
FCS integrates an advanced digital network, and enhanced precision with modern platforms in order to provide greater capabilities for Soldiers. FCS arms the Soldier for today's environments while posturing for future threats and uncertainty. FCS reflects our commitment to fielding trained formations with the best technology

available. FCS gives Soldiers knowledge, and through the network, the means to transmit knowledge. FCS drastically improves lethality, survivability, ISR, Battle Command, battlefield awareness, and logistics forming a quantum leap in force effectiveness. The result is dominant landpower to defeat enemies across the full spectrum of conflict.

Maintaining the momentum of this modernization effort is critical to ensuring Soldiers in combat maintain a decisive advantage over current and future adversaries. For immediate impact, the FCS capabilities will "Spin-out" into the Current Forces to exploit opportunities and sustain critical overmatch. As fielding commences, the impact of the modernization program achieves precision fires, precision tactical awareness and precision logistics—a Joint, revolutionary development in warfare. Army Modernization, with FCS as the core, represents the Nation's commitment to providing Soldiers with the necessary resources to win the Nation's wars.

## Discussion of Future Combat Systems Materiel Programs

The **Soldier** is the integral element of the FCS Brigade Combat Team. The Soldier is connected and integrated to the FCS network and FCS Battle Command. This connectivity provides the Soldier superior situational awareness mounted and dismounted, enabling the Soldier to effectively perform Battle Command functions while maximizing Soldier and force lethality and survivability. Network connectivity also enables the Soldier to more effectively employ and control FCS unmanned ground and aerial systems, and to take full advantage of embedded training, logistics and medical functions.



These network-enabled capabilities are executed when mounted via the MGV Common Crew Station, and when dismounted via the Centralized Controller.

The **Sensors and Platforms** Layer is comprised of a distributed and networked array of multi-spectral sensors that provide the FCS (BCT) with the ability to “see first.” Intelligence, Surveillance, and Reconnaissance sensors will be integrated onto all Manned Ground Vehicles, all unmanned ground vehicles and the two classes of unmanned aerial vehicles within the FCS (BCT). These sensors will be capable of accomplishing a variety of collection missions including Wide Area Surveillance,



Reconnaissance, Surveillance, and Target Acquisition, Mobility and Survivability. In addition to collecting data locally within the FCS (BCT) area of operations, the ISR Layer architecture will facilitate the fusion of Joint, Current Force, and National sensor data into the COP through the Distributed Common Ground System—Army. The sensor data collect from FCS (BCT) internal, Current Force, Joint, and National sensors will provide timely and accurate situational awareness, enhance survivability by avoiding enemy fires, enable precision networked fires and maintain contact throughout an engagement.

To provide warfighters with current, accurate, and actionable information, the data from the various distributed ISR and other external sensor assets are subject to complex data processing, filtering, correlation, aided target recognition, and fusion (level 0 and 1 automated fusion, and levels 2-5 semi-automated fusion). The Sensor Data Management software organizes all the sensor data—including detection reports—and tracks information as received from the sensor packages.

The FCS (BCT) **Unattended Ground Sensors** (UGS) program is divided into two major subgroups of sensing systems: Tactical-UGS, which includes Intelligence, Surveillance and Reconnaissance and Chemical, Radiological and Nuclear (CBRN)-UGS; and Urban-UGS, also known as Urban Military Operations in Urban Terrain Advanced Sensor System (UMASS). An UGS field will include multimode sensors for target detection, location and classification; and an imaging capability for target identification. A sensor field also includes a gateway node to provide sensor fusion and a long-haul interoperable communications capability for transmitting target or situational awareness information to a remote operator, or the common operating picture through the FCS (BCT) JTRS Network. The UGS are used to perform mission tasks such as perimeter defense, surveillance, target acquisition and situational awareness, including Chemical, Radiological, Nuclear and early warning. Urban-Unattended Ground Sensors provide a low cost, network-



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enabled reporting system for situational awareness and force protection in an urban setting, as well as residual protection for cleared areas of Urban Military Operations in Urban Terrain environments. They are hand-employed by Soldiers or delivered on robotic vehicles either inside or outside buildings and structures. Urban UGS support BCT operations by monitoring urban choke points such as corridors and stairwells as well as sewers, culverts, and tunnels. Urban UGS gateways provide the urban situational awareness data interfaced to JTRS networks. Soldiers involved in the testing of the UGS during Spin-out 1 provided invaluable feedback that was incorporated and now in final development and fielding.

The **FCS Network** will provide Soldiers with key situational awareness and communications capability. The network is not only for battlespace awareness, but will also allow Soldiers to receive and transmit a variety of real-time data, including calls for lethal effects. FCS is the flagship of the Army's advanced network development.



Networks have become part of our daily lives and by extension warfare. Rarely will a person leave home without a cell phone, blackberry, or GPS. It should be no different for a Soldier. Except their capabilities will be fully integrated into a single system e.g., a Soldier should not have to look up an address in a cell phone and enter that address into his GPS. The Network will provide the Soldier this solution – integrating the components is key. Networks have become and will continue to be part of our lives.

The FCS network consists of five layers (Standards, Transport, Services, Applications, and Sensors and Platforms) that, when combined, provide seamless delivery of both data and knowledge. The integration of all five layers is necessary to provide greater situational awareness, sensor fusion and networked fires; transforming our ground forces' ability to dominate in land combat.

The **Non-Line-of-Sight-Launch System** (NLOS-LS) consists of a platform-independent Container Launch Unit with self-contained tactical fire control electronics and software for remote and unmanned operations. Each Container Launch Unit consists of a computer and communications system and 15 Precision Attack Missiles with a range of .5 to 40 kilometers. The NLOS-C provides rapidly deployable and network linked off precision guided munitions launch capability that is currently not available within the Army.

Precision Attack Missiles are modular, multi-mission, guided missiles with two trajectories—a direct-fire fast-attack trajectory, and a boost-glide trajectory. The missile receives target information prior to launch, and can receive and respond to target location updates during flight. The PAM supports laser-designated, laser-anointed and autonomous operation modes and is capable of transmitting near-real-time information in the form of target imagery prior to impact. PAM is being



designed to defeat high payoff light and heavy armored targets either moving or stationary. The NLOS-LS, which has also successfully completed airdrops from a C-130 is part of Spin-out 1 and will provide superior situational awareness for Soldiers in any field.

The **Class I Unmanned Aerial Vehicle (UAV)** is a platoon level asset that provides the dismounted Soldier with Reconnaissance, Surveillance and Target Acquisition and laser designation. Total system weight (which includes the air vehicle, a control device, and ground support equipment) is less than 51 pounds and is back-packable in two custom MOLLE type carriers. The air vehicle operates in open, rolling, complex and urban terrains with a vertical take-off and landing capability. It is interoperable with selected ground and air platforms and controlled by mounted or dismounted Soldiers.



The Class I uses autonomous flight and navigation, but it will interact with the network and Soldier to dynamically update routes and target information. It provides dedicated reconnaissance support and early warning to the smallest echelons of the Brigade Combat Team in environments not suited to larger assets.

The Class I system provides a hover capability that is not currently available in the current Army UAV inventory for urban and route surveillance. The Class I system also fills known gaps that exist in force operations, such as: Protect Force in Counterinsurgency (COIN) Operations, Soldier Protection in COIN environment, Ability to Conduct Joint Urban Operations, Enhanced ISR/RSTA Capabilities, and Hover and Stare operations.

The Class I UAV has entered accelerated evaluation by Soldiers at the Army Evaluation Task Force, where Soldiers have started training on the equipment. These evaluations are set to conclude in the Fall of 2008, when FCS and Army capabilities managers will provide recommendation on whether to field the platforms or continue system development under the core FCS program.



The **Class IV Unmanned Aerial Vehicle** has a range and endurance appropriate for the brigade mission. It supports the Brigade Combat Team commander with communications relay, long endurance persistent stare and wide area surveillance. Unique missions include dedicated manned and unmanned teaming with manned aviation; Wide Band Communications

Relay; and standoff Chemical, Biological, Radiological, Nuclear detection with on-board processing. Additionally, it has the payload to enhance the Reconnaissance, Surveillance and Target Acquisition capabilities by cross-cueing multiple sensors. The Class IV will be able to land without a dedicated air field. Class IV development is shared with the Navy's Fire Scout program.



**The Small Unmanned Ground Vehicle** is a lightweight, man portable UGV capable of conducting military operations in urban terrain, tunnels, sewers and caves. The SUGV is an aid in enabling the performance of manpower intensive or high-risk functions (i.e. urban

Intelligence, Surveillance and Reconnaissance missions, Chemicals/Toxic Industrial Materials reconnaissance) without exposing Soldiers directly to the hazard. The SUGV modular design allows multiple payloads to be integrated in a plug-and-play fashion. Weighing less than 30 pounds, it is capable of carrying up to six pounds of payload weight.

The SUGV has entered accelerated evaluation by Soldiers at the Army Evaluation Task Force, where Soldiers have started training on the equipment. These evaluations are set to conclude in Fall 2008, when FCS and Army capabilities managers will provide recommendation on whether to field the platforms or continue system development under the core FCS program.

## The Mounted Combat System

is part of the Manned Ground Vehicle family that provides Line-of-Sight (LOS) and Beyond-Line-of-Sight (BLOS) offensive firepower capability allowing BCTs to close with and destroy enemy forces. The MCS delivers precision fires at a rapid rate to destroy multiple targets at standoff ranges quickly and complements the fires of other systems in the BCT. It is capable of providing direct support to the dismounted infantry in an assault, defeating bunkers and breaching walls during the tactical assault. When employing the Mid-Range Munition, the MCS also provides BLOS fires to destroy point targets through the integrated sensor network. This capability enhances SoS lethality and significantly increases the options available to the BCT commander for the destruction of point targets through the integrated fires network. MCS shares a common chassis with the other FCS Manned Ground Vehicles and consists of Light Weight 120-millimeter Cannon and an Ammunition Handling System.



The **Infantry Carrier Vehicle** is part of the Manned Ground Vehicles family that consists of four platform versions: a Company Commander; a Platoon Leader; a Rifle Squad; and a Weapons Squad. The Infantry Platoon includes an ICV Platoon Leader variant; three ICV Rifle Squad variants; and an ICV Weapons Squad variant. The ICV Rifle Squad variant and ICV Weapons Squad variant each deliver nine-person infantry squads to a location from which they will conduct a close assault. The ICV effectively employs weapon systems and rapidly maneuvers during blackout, day and night operations, inclement weather and limited visibility periods. The ICV carries the majority



of equipment freeing the individual Soldier to focus on mission. The ICV can move, shoot, communicate, detect threats and protect crew and critical components under most land-surface environments. Data transfer with other components of the BCT permits constant update of the common operational picture and rapid identification of targets. The ICV features the MK44 30-millimeter cannon as its primary armament plus a 7.62 machine gun.



The **Non-Line of Sight Cannon (NLOS-C)** is an indirect fire support component of the Manned Ground Vehicle family. The NLOS-C is a self propelled howitzer with a two man crew. It will provide networked, extended-range, responsive and sustained precision attack of point and area targets in support of the FCS (BCT). It fires a suite of munitions that include special purpose capabilities to provide a variety of effects on demand including precision guided munitions such as the XM982 Excalibur.

NLOS-C provides close support and destructive fires for tactical standoff engagement during both offensive

and defensive operations in concert with line-of-sight, beyond-line-of-sight, other NLOS, external and Joint capabilities in combat scenarios spanning the spectrum of ground combat and threats. It has a 155-millimeter, Zone 4, 38-caliber cannon, fully automated armament system and a high level of commonality with other MGCV variants. It incorporates a suite of protection measures to enhance crew and platform survivability. The NLOS-C is deployable worldwide and can operate in a wide range of natural environmental conditions. The cannon can move rapidly, stop quickly and deliver lethal first round effects on target in record time.

The NLOS Cannon has a Multiple Round Simultaneous Impact capability. The MRSI capability, coupled with the NLOS-C superior sustained rate of fire, will provide record effects on target from a smaller number of systems. The cannon, like all MGCV variants, can rapidly rearm and refuel and its system weight makes it uniquely deployable. Fully automated handling, loading, and firing is a centerpiece of the NLOS-C. The NLOS-C balances deployability and sustainability with responsiveness, lethality, survivability, agility and versatility. The NLOS-C is designed to minimize its logistic and maintenance footprint in the theater of operation and to employ advanced maintenance approaches to increase availability and to support sustainability.

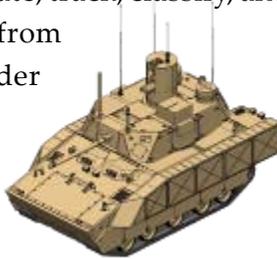
The **Non-Line of Sight Mortar** is the short-to-mid-range indirect fire support component of the Manned Ground Vehicle family. It provides networked, responsive and sustained indirect fire support to the Combined Arms Battalion in the FCS (BCT). It fires a suite of 120-millimeter munitions that includes special purpose capabilities to provide a variety of fires on demand including precision guided munitions. NLOS-M provides close support and destructive fires for tactical standoff engagement during both offensive and defensive operations in concert with line-of-sight, beyond-line-of-sight, other NLOS, external and

# MODERNIZATION STRATEGY

Joint capabilities in combat scenarios spanning the spectrum of ground combat and threats. The NLOS-M mounts a secondary armament and will incorporate a suite of protection measures to enhance the three person crew's survivability.



The **Reconnaissance and Surveillance Vehicle** is part of the Manned Ground Vehicle family and is the eyes and ears of the battlefield. It features a suite of advanced sensors to detect, locate, track, classify, and automatically identify targets from increased standoff ranges under all climatic conditions, day or night. Included in this suite are a mast-mounted, long-range electro-optic infrared sensor, an emitter mapping sensor for Radio Frequency intercept and direction finding, remote chemical detection and a multifunction RF sensor. The RSV also features the onboard capability to conduct automatic target detection, aided target recognition and level one sensor fusion. To further enhance the scout's capabilities, the RSV is equipped with Unattended Ground Sensors, a Small Unmanned Ground Vehicle and a Class I Unmanned Aerial Vehicle system.

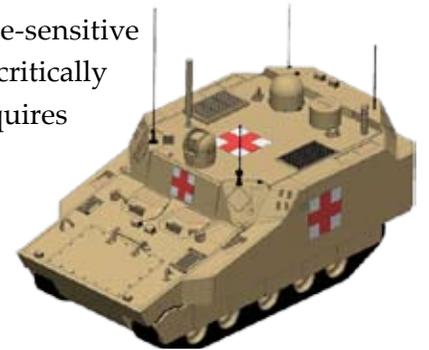


The **Command and Control Vehicle** is part of the Manned Ground Vehicle family and the hub of battlefield command and control. The C2V platform provides the tools for commanders to synchronize their knowledge of combat power with the human dimension of leadership. It is located within the headquarters sections at each echelon of the BCT down to the company level, and via mission workstations contain the warfighter machine interface that allows commanders and their staffs to access Battle Command

applications that will aid in mission planning and preparation, mission execution and situation understanding. These applications enable commanders and their staffs to perform tasks such as fusing friendly, enemy, civilian, weather and terrain situations and distributing this information via a Common Operating Picture. Commanders also utilize the C2V's integrated C4ISR suite to receive, analyze and transmit tactical information both inside and outside the BCT. The Command and Control Vehicle can also employ unmanned systems, such as unmanned aerial vehicles to enhance situational awareness throughout the BCT.



The **Medical Vehicles** are part of the Manned Ground Vehicle family and are designed to provide advanced trauma life support to critically injured Soldiers. The Medical Vehicles serve as the primary medical system within the BCT and have two versions: Evacuation and Treatment. The time-sensitive nature of treating critically injured Soldiers requires an immediately responsive force health protection system with an expedient field evacuation system.

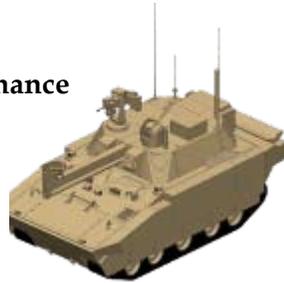


The Medical Vehicle-Evacuation allows trauma specialists, maneuvering with combat forces, to be closer to the casualty's point-of-injury and is used for casualty evacuation. The Medical Vehicle-Treatment vehicle enhances the ability to provide Advanced Trauma Management/Advanced Trauma Life Support treatments and procedures forward for more rapid casualty interventions and clearance of the battlespace.

Both Medical Vehicle versions will be capable of conducting medical procedures and treatments using installed networked medical information interfaces, with the ability to interface with Medical Communications for Combat Casualty Care. The Theater Medical Information Program Real-time monitoring/reporting of medical status during medical sustainment operations is another core capability.

### The Recovery and Maintenance

**Vehicle** is part of the Manned Ground Vehicle family and is a maneuver sustainment system, providing recovery and



maintenance support within the BCT. Each BCT has a small number of 2-3 man Combat Repair Teams within the organic Brigade Support Battalion to perform field maintenance beyond the capabilities of the crew chief/crew, more in-depth Battle Damage Assessment Repair and recovery operations. The FRMV's recovery winch and integrated crane will provide maintenance lift capability and recovery of overturned or mired vehicles. The FRMV has a crew of three with additional space for two recovered crew members and carry equipment and spare parts to conduct on-site vehicle repairs. The weapon system for the FRMV is the Close Combat Armament System.

The **Multifunctional Utility/Logistics and Equipment** (MULE) Vehicle is a 2.5-ton Unmanned Ground Vehicle that will support dismounted and air assault operations. The Multifunctional Utility Logistics and Equipment Vehicle is sling-loadable under military rotorcraft. The MULE Vehicle has three variants sharing a common chassis: transport, countermine and the Armed Robotic Vehicle Assault-Light.

The Transport MULE Vehicle will carry 1,900-2,400 pounds of equipment and rucksacks for dismounted infantry squads with the mobility needed to follow squads in complex terrain.

The Countermine MULE Vehicle will provide the capability to detect, mark and neutralize anti-tank mines by integrating a mine detection mission equipment package from the Ground Standoff Mine Detection System, FCS (BCT) program.

The ARV-Assault-Light MULE Vehicle is a mobility platform with an integrated weapons and reconnaissance, surveillance and target



acquisition package to support the dismounted infantry's efforts to locate and destroy enemy platforms and positions. The MULE Common Mobility Platform is the program's centerpiece providing superior mobility built around the propulsion and articulated suspension system to negotiate complex terrain, obstacles and gaps that a dismounted squad will encounter.

The FCS program is truly revolutionary, not just an incremental improvement to existing capabilities. Future Combat Systems BCTs will far exceed the capabilities of our current brigades. Soldiers in FCS units will be better protected by better and scalable armor, by using unmanned vehicles and unattended sensors to see and destroy the enemy at safe distances and by using the active protective system to destroy incoming enemy rounds. FCS will save lives as it increases Soldier capability and productivity.

## Chapter 6—Conclusions

### Risks to Army Modernization

Primary risks to Army modernization involve loss of support by the Administration or Congress. Even small cuts in modernization funding will impact Soldiers in today's fight. Small decrements in FCS funding will impact our ability to provide the benefits of future-related technologies to Soldiers today. The affordability of modernization cannot be placed above risk to Soldiers or the readiness of the Army. There is also concern on the part of some that the needs of the current fight outweigh our commitment to modernize. We cannot mortgage the future to support the current fight. We must restore balance and build readiness through modernization for Soldiers both now and in the future.



A potential drawdown in current operations creates the potential that supplemental dollars could decrease. This would be acceptable if the supplemental only funded contingency costs, but some of programs funded with

supplemental appropriations would require transfer to the base budget. The Army has procured a large amount of equipment in the last six years for use in the Global War on Terror. While this equipment is used in Iraq and Afghanistan, sustainment of this equipment is funded by supplemental dollars and upon return we anticipate that Reset of this equipment would also be funded in supplementals. Long term sustainment of that equipment, however, would require funding support in the base budget, where dollars did not previously exist. These requirements would all compete for modernization funding.

### Conclusion

The Army has moved quickly to properly equip, modernize, and transform our Army with the best available equipment, but we still have much to do. The Army must have continued access to stable and predictable base and supplemental funding. Access to proper funding allows the Army to better manage resources, maintain a stable work force and generate efficiencies with industry. It takes one year to produce a Stryker vehicle and 18 months to recapitalize an Abrams Tank. Predictable funding can cut these production and recapitalization times nearly in half through more timely procurement of necessary parts.

Equipping and modernizing are not just challenges for the Army. Proper equipping, both for today and for the future, have implications for the security of our Nation. Balancing equipping and modernization is a challenge the Army needs to overcome in order to ensure we can defend the Nation today and prepare for the future. This is a matter of National priority, not affordability.

Plan as we may, the actions of the enemy affect the true costs of war. Resource tension will remain a constant as long as we remain engaged in combat operations while continuing to modernize and transform our Army. Adequate funding is essential to on-time equipping and modernization for our Soldiers; this is something we can plan for, and we owe them nothing less. With

continued support from the President, the Secretary of Defense, and Congress for our needs, the Army will be able to execute this modernization strategy in order to achieve balance and maintain the readiness of our Army in an era of persistent conflict.

## ACRONYMS

A2C2	Army Airspace Command and Control
ABCS	Army Battle Command System
AC	Active Component
ACA	Airspace Control Authority
ACOM	Army Command
ACP	Army Campaign Plan
ACR	Armored Cavalry Regiment
ADA	Air Defense Artillery
ADAM	Air Defense and Airspace Management
ADSI	Air Defense System Integrator
AETF	Army Evaluation Task Force
AFATDS	Advanced Field Artillery Tactical Data System
AIM	Abrams Integrated Management
ALO	Authorized Level of Organization
AMCB	Army Marine Corps Board
AMD	Air and Missile Defense
AMF	Army Modular Force
AMRAAM	Advanced Medium-Range Air-to-Air Missile
APOD	Aerial Port of Debarkation
APS	Army Prepositioned Stock
AR2B	Army Requirements and Resourcing Board
ARCIC	Army Capabilities Integration Center
ARFORGEN	Army Force Generation
ARPL	Army Resourcing Priorities List
ARSOF	Army Special Operations Forces
ASCC	Army Service Component Command
ASOA	Army Special Aviation Operations
ASOS	Army Support to Other Services
ASV	Armored Security Vehicle
ATACMS	Army Tactical Missile System
ATCCS	Army Tactical Command and Control System
ATGM	Anti-tank Guided Missile
AW2	Army Wounded Warrior Program
AWACS	Airborne Warning and Control System
AWG	Asymmetric Warfare Group
BCTP	Battle Command Training Program
BDA	Battle Damage Assessment
BLOS	Beyond Line-of-Sight

BMD	Ballistic Missile Defense
BOS	Battlefield Operating System
BRAC	Base Realignment and Closure
C-RAM	Counter-Rocket, Artillery and Mortar
C4ISR	Command, Control, Communications, Computer, Intelligence, Surveillance and Reconnaissance
CAB	Civil Affairs Brigade; Combat Aviation Brigade
CAT	Civil Affairs Team
CATS	Combined Arms Training Strategy
CBPSS	Chemical Biological Protection Shelter System
CBRNE	Chemical, Biological, Radiological, Nuclear and (High-yield) Explosives
CFLCC	Coalition Forces Land Component Command
CHATS	Counterintelligence/Human Intelligence Automated Tool Set (
CHIMS	Counterintelligence/Human Intelligence Information Management System
CIDS	Capabilities Integration and Development System
CLAWS	Complementary Low-Altitude Weapons System
CMASST	Combat Medical Advanced Skills Training
CMOC	Civil-Military Operations Center
CMTC	Combat Maneuver Training Center
COBRA	Collection of Broadcasts from Remote Assets
COE	Center of Excellence; Common Operating Environment; Contemporary Operating Environment
COMINT	Communications Intelligence
COP	Common Operational Picture
COTS	Commercial off-the-Shelf
CP DEPMEDS	Chemically Protected Deployable Medical System
CPOF	Command Post of the Future
CREW	Counter Radio Controlled IED Electronic Warfare
CROP	Container Roll-in/Out Platform
CROWS	Common Remotely Operated Weapon Station
CSB (ME)	Combat Support Brigade (Maneuver Enhancement)
CSH	Combat Support Hospitals
CTCMP	Combat Training Centers Modernization Program
CVS	Combat Vehicle System
DAB	Defense Acquisition Board
DARPL	Dynamic Army Resourcing Priority List
DARPA	Defense Advanced Research Projects Agency
DIMHRS	Defense Integrated Military Human Resources System
DISA	Defense Information Systems Agency

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DLAMP	Defense Leadership and Management Program
DOTMLPF	Doctrine, Organization, Training, Materiel, Leadership and Education, Personnel, and Facilities
DSCS	Defense Satellite Communications System
DTAS	Deployed Theater Accountability Software
EAC	Echelon Above Corps
EBCT	Evaluation Brigade Combat Team
ENVG	Enhanced Night Vision Goggles
EOD	Explosive Ordnance Disposal
EPLRS	Enhanced Position Location Reporting System
EQ4	EQUIPFOR
ETC	Exportable Training Capability
FAAD-C2	Forward Area Air Defense-Command and Control
FARRP	Forward Area Rearm and Refueling Point
FAWPSS	Forward Area Water Point Supply System
FBCB2	Force XXI Battle Command, Brigade and Below
FCS	Future Combat Systems
FDU	Force Design Update
FFW	Future Force Warrior
FLIR	Forward-Looking Infrared
FMTV	Family of Medium Tactical Vehicles
FOB	Forward Operating Base
FRK	Field Repair Kit
FRS	Forward Repair System
FSB	Functional Support Brigade; forward support battalion
FTI	Fixed Tactical Internet
FYDP	Future Years Defense Plan
GCCS	Global Command and Control System
GCS	Ground Control Station
GDPR	Global Defense Posture Realignment
GIG	Global Information Grid
GMLRS	Guided Multiple Launch Rocket System
GOTS	Government Off-the-Shelf
GSB	Group Support Battalions
HBCT	Heavy Brigade Combat Team
HEMTT	Heavy Expanded Mobility Tactical Truck
HET	Heavy Equipment Transporter
HIMARS	High Mobility Artillery Rocket System
HLVTOL	Heavy Lift Vertical Takeoff and Landing
HMMWV	High Mobility Multipurpose Wheeled Vehicle
HUMINT	Human Intelligence

IAMD	Integrated Air Missile Defense
IBAS	Improved Bradley Acquisition Sight
IBCT	Infantry Brigade Combat Team
IED	Improvised Explosive Device
IFF	Identification, Friend or Foe
IFICS	In-Flight Interceptor Communications
IMS	Intelligent Munitions System
IOC	Initial Operational Capability
IRB	Improved Ribbon Bridge
ISR	Intelligence, Surveillance, and Reconnaissance
ITAS	Improved Target Acquisition System
ITSB	Integrated Theater Signal Battalion
IVMMD	Interim Vehicle Mounted Mine Detector
JCA	Joint Cargo Aircraft
JCIDS	Joint Capabilities Integration and Development System
JEM	Joint Effects Model
JFLCC	Joint Force Land Component Commander
JHSV	Joint High-Speed Vessel
JIC	Joint Integrating Concept
JIEDDO	Joint IED Defeat Organization
JIIM	Joint, Interagency, Intergovernmental, and Multinational
JLENS	Joint Land Attack Cruise Missile Defense Elevated Netted Sensor System
JMPS	Joint Mission Planning System
JNN	Joint Network Node
JOA	Joint Operational Area
JPEO	Joint Program Executive Office
JROC	Joint Requirements Oversight Council
JRTC	Joint Readiness Training Center
JTAMD	Joint Theater Air and Missile Defense
JTRS	Joint Tactical Radio System
JWARN	Joint Warning and Reporting Network
KFSV	Knight Fire Support Vehicle
KPP	Key Performance Parameter
LACMS	Land Attack Cruise Missile
LLDR	Lightweight Laser Designator Range Finder
LM	Lifecycle Management
LOS	Line-of-Sight
LRAS3	Long-Range Advanced Scout Surveillance System
LRIP	Low-Rate Initial Production
LTAS	Long-Term Armor Strategy

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<b>LUH</b>	<b>Light Utility Helicopter</b>
<b>M-TADS</b>	<b>Modernized Target Acquisition Designation Sight</b>
<b>MAPS</b>	<b>Modular Azimuth Positioning Systems</b>
<b>MBCOTM</b>	<b>Mounted Battle Command on the Move; Mobile Battle Command on the Move</b>
<b>MBE</b>	<b>Modular Brigade Enhancement</b>
<b>MCS</b>	<b>Maneuver Control System; Mounted Combat System</b>
<b>MCU</b>	<b>Multi-Component Unit; Munition Control Unit</b>
<b>MEADS</b>	<b>Medium Extended Air Defense System</b>
<b>MEF</b>	<b>Marine Expeditionary Force</b>
<b>MEP</b>	<b>Mission Equipment Package</b>
<b>METL</b>	<b>Mission Essential Task List</b>
<b>METT-TC</b>	<b>Mission, Enemy, Terrain and Weather, Time, Troops Available and Civilian</b>
<b>MGS</b>	<b>Mobile Gun System</b>
<b>MIHDS</b>	<b>Modular Integrated Helmet Display System</b>
<b>MKT</b>	<b>Mobile Kitchen Trailer</b>
<b>MLRS</b>	<b>Multiple Launch Rocket System</b>
<b>MMPV</b>	<b>Medium Mine Protected Vehicle</b>
<b>MOUT</b>	<b>Military Operations on Urban Terrain</b>
<b>MPCV</b>	<b>Mine Protected Clearance Vehicle</b>
<b>MRBC</b>	<b>Multi-role Bridge Company</b>
<b>MRE</b>	<b>Mission Readiness Exercise</b>
<b>MRX</b>	<b>Mission Rehearsal Exercise</b>
<b>MSE</b>	<b>Mobile Subscriber Equipment</b>
<b>MSS</b>	<b>Mounted Soldier System</b>
<b>MSTC</b>	<b>Medical Simulation Training Centers</b>
<b>MTV</b>	<b>Medium Tactical Vehicle</b>
<b>MULE</b>	<b>Multifunctional Utility/Logistics and Equipment Vehicle</b>
<b>MWSS</b>	<b>Mounted Warrior Soldier System</b>
<b>NBC</b>	<b>Nuclear, Biological, Chemical</b>
<b>NBCRV</b>	<b>Nuclear, Biological, and Chemical Reconnaissance Vehicle</b>
<b>NET</b>	<b>New Equipment Training</b>
<b>NLOS</b>	<b>Non-Line-of-Sight</b>
<b>NLOS-C</b>	<b>Non-Line-of-Sight-Cannon</b>
<b>NLOS-LS</b>	<b>Non-Line-of-Sight Launch-System</b>
<b>NRCM</b>	<b>Non-rated Crew Member</b>
<b>NSPS</b>	<b>National Security Personnel System</b>
<b>NSS</b>	<b>National Security Strategy</b>
<b>NTC</b>	<b>National Training Center</b>
<b>NVS</b>	<b>Night Vision Sensor</b>

OC/T	Observer Controller/Trainer
OICW	Objective Individual Combat Weapon
OPFOR	Opposing Force
OT&E	Operational Test and Evaluation
PAM	Precision Attack Missile
PDM	Presidential Decision Memorandum
PEO STRI	Program Executive Office for Simulation, Training and Instrumentation
PEO C3T	Program Executive Office Command, Control and Communications Tactical
PEG	Program Evaluation Group
PEO	Program Executive Office/Officer
PEO EIS	Program Executive Office Enterprise Information Systems
PEO IEWS	Program Executive Office Intelligence, Electronic Warfare and Sensors
PGMM	Precision Guided Mortar Munitions
PGP	Power Generation Platform
PM	Program Manager
PM ITTS	Program Manager for Instrumentation Targets and Threat Simulators
POM	Program Objective Memorandum
POTF	Psychological Operations Task Force
PPP	Power Projection Platform
PSYOP	Psychological Operations
RAID	Rapid Aerostat Initial Deployment
RAM	Rockets, Artillery and Mortar
RCO	Rifle Combat Optic
RDA	Research, Development, and Acquisition
RDTE	Research, Development, Test, and Evaluation
REF	Rapid Equipping Force
RFI	Rapid Fielding Initiative; Radar Frequency Interferometer
RRSOD	Ranger Regiment Support Operations Detachment
RRXXI	Ranger Regiment XXI
RSTA	Reconnaissance, Surveillance, and Target Acquisition
RSTA/ISR	Reconnaissance, Surveillance, and Target Acquisition / Intelligence Surveillance and Recon
RSTB	Ranger Special Troop Battalion
RTD&E	Research Testing Development and Evaluation
RWS	Remote Weapons Station
SaaS	Soldier as a System
SAMS-E	Standard Army Maintenance System
SASS	Semi-Automatic Sniper System
SBCT	Stryker Brigade Combat Team

# MODERNIZATION STRATEGY

SEP	Soldier Enhancement Program; System Enhancement Program
SF	Special Forces
SFG	Special Forces Group
SHSS	Strategic High-Speed Sealift
SICPS	Standardized Integrated Command Post System
SINCGARS	Single Channel Ground and Airborne Radio System
SLAMRAAM	Surface-Launched Advanced Medium-Range Air-to-Air Missile
SMS	Strategic Management System
SOF	Special Operations Forces
SoS	System-of-Systems
SPOD	Seaport of Debarkation
STAMIS	Standard Army Management Information Systems
STF	Set the Force
STIR	Special Technical Inspection and Repair
SUST BDE	Sustainment Brigade
TAC	Theater Aviation Command
TACSIM	Tactical Simulation
TADLP	The Army Distributed Learning Program
TADSS	Training Aids, Devices, Simulations and Simulators
TAP	The Army Plan
TDA	Table of Distribution and Allowances
TESS	Tactical Engagement Simulation System
TIB	Theater Intelligence Brigade
TIN	Tactical Installation and Networking
TPE	Theater Provided Equipment
TPG	Transformation Planning Guidance
TSC	Theater Sustainment Command
TSV	Theater Support Vessel
TTHS	Trainees, Transients, Holders and Students
TTP	Tactics, Techniques and Procedures
UAH	Up-armored HMMWV
UAS	Unmanned Aircraft System
UAV	Unmanned Aerial Vehicle
UGS	Unattended Ground Sensors
UGV	Unmanned Ground Vehicle
WIN-T	Warfighter Information Network-Tactical
WITS	Wireless Independent Target System
WMD	Weapon of Mass Destruction
WTBD	Warrior Tasks and Battle Drills

